UNDERSTANDING AND ADDRESSING THE RELATIONSHIP BETWEEN WEIGHT BIAS AND DEPRESSIVE SYMPTOMS IN COLLEGE MEN

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The current study of 151 college men explored weight-related factors that contribute to depressive symptoms among undergraduate men using structural equation modeling (SEM). Results of SEM supported the hypothesis that perceived negative messages about one's body and body dissatisfaction were significant mediators of the relationship between BMI and depressive symptoms. Moreover, social connectedness and academic self-concept were significant moderators of the relationship between body dissatisfaction and depressive symptoms. Although self-esteem was not a significant moderator, it was significantly related to body dissatisfaction, despite the men's magnitude of perceived body pressures. These findings inform therapeutic work with college men, signifying the importance of improving the quality of their relationships in family and social systems to reduce both depressive symptoms and body dissatisfaction. Furthermore, advocacy programming to counter body related pressure from media, societal systems, and other people would likely benefit college men struggling with body dissatisfaction and depressive symptoms.

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INTRODUCTION

Early literature indicated an increase in overweight stigmatization toward women compared to men because of the greater sociocultural pressures placed on women (Rothblum et al., 1988). In recent decades, however, men have experienced increasing pressure to conform to the fit male ideal body type (McCabe & Ricciardelli, 2003). When asked about social pressures, young men discuss the pressure to be slender and muscular. Moreover, men linked well-toned muscular bodies with power and confidence (Grogan & Richards, 2002). Compared to their female counterparts, however, the pressure males endure may be aimed at weight gain and muscular building (McCabe & Ricciardelli, 2001). Sociocultural pressures regarding body image ideals may then influence the desire to lose weight in, as both men and women who perceive themselves as overweight engage in greater weight loss behaviors, compared to those who do not perceive themselves as such (Lemon et al., 2009).

The pressure to conform to a masculine ideal and the experiences of weight oppression (e.g., Durso et al., 2012; Puhl & Heuer, 2009) have demonstrated a significant relationship to decreased physical and psychological health (i.e., body dissatisfaction, depression, etc.). In a study of 99 participants, people who were obese indicated lower physical self-concept, compared to their non-obese counterparts (Jacobs & Wagner, 1984). Furthermore, low physical self-concept was related to negative self-appraisals of health, appearance, body image, and sexual functioning (Jacobs & Wagner, 1984). Encountering negative messages of weight bias has also been associated with a higher probability of depressive symptoms (Carpenter et al., 2000; Ross, 1994; Strine et al., 2008).

The purpose of the current study is to examine how constructs related to the experience of being overweight or obese may mediate the relationship between body mass index (BMI) and

depressive symptoms in college men. The proposed mediators are perceived messages related to body image ideals and body dissatisfaction. Due to the limited research conducted in men in weight-related areas, literature conducted with female participants will be drawn upon to adequately discuss the proposed constructs.

LITERATURE REVIEW

BMI and Depression

Prevalence

The World Health Organization (WHO) has estimated more than 1.4 billion individuals worldwide are classified as obese (WHO, 2013). Within those people impacted by high rates of overweight status or obesity, young adults have seen the greatest increase in rates of overweight individuals since the 1980s (Flegal et al., 2012). A study from 2015 collected self-reported weight, height, psychological, and academic achievement information in over 1700 students (Odlaug et al., 2015). A total of 492 students, or nearly 30%, were overweight or obese. Furthermore, in 2011, the American College Health Association estimated that 34.1% of U.S. college students were currently overweight or obese. Overweight and obese status has been linked to and associated with various negative consequences, such as decreased physical and psychological health (e.g., Finkelstein et al., 2008; Flegal et al., 2012; Odlaug et al., 2015; Poirier et al., 2006). Throughout the current study, Center for Disease Control guidelines for Body Mass Index (BMI) will be utilized for categorization (CDC, 2016): < 18.5 underweight, 18.5 to 24.99 normal weight, 25 to 29.99 overweight, and >= 30 obese.

High BMI and Depressive Symptoms

Overweight and obesity are associated with elevated depressive symptoms, as well as lower academic achievement, when compared to individuals who are not overweight or obese (Odlaug et al., 2015). Sociocultural and psychological pathways may also influence the development of depression in those who are overweight or obese (Derenne & Beresin, 2006). College students who are overweight or obese report a range of emotional and social problems, including depression, stigmatization, and lower academic achievement (Adams & Colner, 2008;

Desa et al., 2008). Environmentally, being overweight may be associated with stressors that could contribute to depression. For example, individuals who are overweight or obese may also interact in the environment in a different manner, such as having difficulty finding clothing, having to buy two seats on an airplane, and not feeling comfortable in certain spaces (Gruys, 2012; Kwan, 2010; Owen, 2012). The dissatisfaction with ones' body and the ideal of being thin may contribute to low self-esteem and decreased physical self-concept (Hoek et al., 2005). When researchers explored the possibility of body perception-related mediators, participants who had negative body appraisals were more at risk for depressive symptoms (Beesdo et al., 2009; Gadalla & Piran, 2008; Luppino et al., 2010). The current study aims to explore some different mechanisms by which elevated BMI is linked with depressive symptoms (for more information see Appendix A).

Experiences of Body Shaming

Commonly, overweight and obese individuals encounter weight bias (Carels et al., 2010; Durso et al., 2012; Puhl & Heuer, 2009; Sutin & Terracciano, 2016). Prejudice against overweight and obese people is also referred to as "fat phobia" (Robinson & Bacon, 1996, p. 175). Weight bias and fat phobia convey the message that someone is not meeting culturally based body-image ideals and the stigma associated with obesity appears to be increased over the past four decades (Latner & Stunkard, 2003). Moreover, people with elevated BMI face more frequent weight biases and pressures (Carr & Friedman, 2005). For example, observations of over 3,000 Americans adults in the Midlife Development study demonstrated that obese individuals were more likely to report and experience day-to-day and institutional prejudice compared to individuals in the normal range of BMI (Carr & Friedman, 2005).

Sources of Weight Bias

Overweight and obese individuals may encounter both implicit and explicit forms of weight bias (e.g., Rudman et al., 2002; Schwartz et al., 2003; Teachman & Brownell, 2001; Teachman et al., 2003; see Appendix B for more information) and systemic weight stigma occurs in an abundance of different settings such as educational institutions, health care organizations, occupational settings, interpersonal relationships, and media. Within educational institutions, obesity has long been associated with lower college acceptance rates as well as less favorable ratings by teachers or professors (Canning, & Mayer, 1966; Canning & Mayer, 1967). More recently, fewer offers of admission after in-person interviews were significantly predicted by higher BMI (Burmeister et al., 2013). Overall, adolescents and young adults who are obese are more likely to complete fewer years of school (Gortmaker et al., 1993) and are less likely obtain college degrees (Fowler-Brown et al., 2010).

Similar bias occurs in health care settings. A study conducted with French general practitioners, reported that 30% of 600 practitioners had negative attitudes toward overweight and obese people (Bocuier et al., 2005). Moreover, 57% of the practitioners were pessimistic about overweight patient's ability to lose weight (Bocuier et al., 2005). The negative perception of overweight individuals in the medical field is supported by additional research. More than 50% of 620 physicians, viewed obese patients as "awkward," "unattractive," "ugly," and "noncompliant" (Foster et al., 2003). Furthermore, when health professionals (N = 389) were administered the Implicit Associations Test assessing if they associated obese people or thin people with "good" or "bad", health professionals were observed having implicit biases of pro-thin and anti-fat endorsed stereotypes such as lazy, stupid, and worthless (Schwartz et al., 2003). There is also evidence to suggest that higher patient BMI is associated with lower amounts of

respect from medical professionals (Huizinga et al., 2010; Huizinga et al., 2009). The specific impact of weight bias experienced from physicians is unknown; however, associations suggested overall poorer well-being for individuals whose doctors held greater weight bias (Friedman et al., 2005).

Weight Bias in the Workforce

Overweight and obese people have expressed employment-related bias. In an experimental study, two resumes, including photos, were presented and compared by 104 college students (Rothblum et al., 1988). The overweight applicants were more negatively evaluated than normal weight applicants on areas such as supervisory potential, self-discipline, personal hygiene, professional appearance, and ability to perform difficult tasks (Rothblum et al., 1988). Moreover, weight bias has even been observed in power differentials within a business environment, as managers of normal weight are rated more positively than mangers of higher weight (Decker, 1987).

Interpersonal Relationships

Interpersonal relationships, such as those with friends and family, are also an influential source of weight stigma (Puhl & Brownell, 2006). Bias may be expressed through negative comments, negative assumptions, and inappropriate remarks (Puhl et al., 2007; Puhl & Brownell, 2006). In a longitudinal study of over 2,000 young adults, nearly 23% of males reported experiencing hurtful weight-related commented from family members, and 24% of males experienced comments from a significant other (Eisenberg et al., 2012). In a study of nearly 180 obese participants, over 50% indicated experiencing weight stigma from family members, which, in turn, was significantly related to reported weight bias internalization (Pearl et al., 2018). Overweight men who reported stigmatization from their sons indicated lower self-esteem than

men who did not experience such stigma (Puhl & Brownell, 2006). Weight bias appears to occur from numerous sources that directly influence individuals.

Media

Forms of media have also been indicated as influential forums for the occurrence of weight stigma and weight bias. Specifically, weight bias appears to be perpetuated by the media through the internalization of idealized body types that are inconsistent with an overweight status and evidence for weight bias in media sources is observed to stigmatize overweight or obese people (e.g., Greenberg et al., 2003; Himes & Thompson, 2007). Heuer, McClure, and Puhl conducted a content analysis of images in various new media and 72% of images in various news media sources depicted overweight or obese individuals in a stigmatizing manner, as overweight or obese people were significantly more likely to be showing their lower bodies or stomachs in the images and have their heads cropped out of the photos when compared to normal weight counterparts (2011). Furthermore, obese or overweight images were also more likely to be shown eating or drinking than were non-overweight individuals and were significantly less likely to be fully clothed, wearing professional clothes, or exercising than images of normal-weight individuals (Heuer et al., 2011).

The ideals presented in the media specifically depicted and expected males to be muscular (Ricciardelli & McCabe, 2003). Furthermore, in 2006, television depicted 24% of males as overweight or obese, compared to the general US population of 59% of males (Klein & Shiffman, 2006). Frederick, Fessler, and Haselton analyzed popular magazines and revealed that the ideal male body marketed toward men was much more muscular than the image depicted in advertisements that targeted women, thus creating a disconnect between what a man may aspire to look like and the preferences of the opposite sex (2005).

Prior research has suggested negative effects from viewing thin-ideal media images, such as decreased body dissatisfaction (Tiggemann et al., 2014). Specifically, in a study of 287 college women, internalization of the thin ideal was significantly related to body dissatisfaction (Nouri et al., 2011). Moreover, thin-ideal internalization mediated the relationship between media exposure and body dissatisfaction (Nouri et al., 2011). Another study that examined the relationships between self-esteem and drive for thinness, in addition to media influence and drive for thinness, in college men found significant associations between self-esteem and drive for thinness, as well as media influence and drive for thinness (Fernandez & Pritchard, 2012). For men, media models were the strongest predictor for drive for thinness and college men the secondary influence was internalization of socio-cultural body messages (Fernandez & Pritchard, 2012). Pearl, Puhl, and Brownell found that male participants who viewed stigmatizing images of obese people endorsed greater negative attitudes toward obese people (2012). In addition, participants who viewed stigmatizing images were more likely to indicate less desire social engage with people depicted in the viewed image than those who viewed positive images (Pearl et al., 2012). Alternatively, men who viewed positive media obesity images indicated reduced weight-based stigmatizing perceptions (Pearl et al., 2012).

Weight Bias in College Students

College students are particularly vulnerable to experience weight prejudice and resulting distress (Latner et al., 2012). At a stage of major transition into adult life, young adult college students are susceptible to experience pressures of perceived public stigma. The transition into university can be relatively stressful; research suggests that the majority of students show a rise in psychological disturbance, such as depression and obsessionality (Fisher & Hood, 1987). Leaving home and coping adequately with the change of high school home life to new

independent college life is difficult (Fisher & Hood, 1987) and the transition into college may then influence how one perceives or is influenced by external peer or public stigma (Latner et al., 2012). More specifically related to obesity, in a study of over 350 university students, the majority endorsed high levels of stigma toward obese people regardless of their own weight (Latner, Stunkard, & Wilson, 2005). Contributing to the stigma, young adults (ages 18-29) are experiencing high rates of obesity (Barbour-Tuck et al., 2018; Flegal et al., 2012; Mokdad et al., 1999), which is significantly related shame, guilt, and body dissatisfaction (Friedman & Brownell, 1995).

Possible Outcomes of Weight Bias

Experiences of weight bias and weight stigma are have been associated with elevated symptoms of depression. The negative messages experienced from encountering implicit or explicit weight bias relates to higher probability of depressive episodes, as well as an increase in suicidal ideation and attempts (Carpenter et al., 2000; Ross, 1994). Similarly, individuals who have experienced weight stigma reported lower quality of life than people of normal weight who have not encountered weight bias (Carpenter, et al., 2000).

Furthermore, individuals who become overwhelmed by stress may be more likely to suffer from depression (e.g., Dragan & Akhtar-Danesh, 2007; Khajehnasiri et al., 2014; Taylor, Washington, Artinian, & Lichtenberg, 2008). In conjunction, as stress increases in an individual's life, reported depressive symptoms appear to increase (Hankin, 2010). Weight stigma may act as a source of stress, and therefore, influence the development of depressive symptoms in obese and overweight individuals. In a study of over 20,000 adults, obese individuals were more likely to report depressive symptoms and, furthermore, their experienced weight-based discrimination accounted for 31% of their obese-related elevated depressive

symptoms (Robinson et al., 2017). Weigh bias conveys an expectation to change themselves and meet an ideal image, and therefore, places men at the risk of depressive symptoms.

Perception of Body-Related Pressures

Societal Views – Blaming the Individual

As an aspect of weight bias, overweight and obese people are subjected to stereotypes, negative social evaluation, and misinformation about their condition (Friedman et al., 2002). Specifically, within the societal context, there is a belief that the cause of a person's obesity is due to their own actions and behaviors (Teachman et al., 2003). The belief that overweight people are to blame for their own weight has been associated with increased negative perceptions about overweight individuals (Blaine & Williams, 2004; Hansson & Rasmussen, 2014).

The traditional Western medical model of obesity can perpetuate the idea that obesity is within an individual's personal control, as though it is based on the simple principle that the caloric intake of overweight people exceeds their energy expenditure (Mayer, 1983). This simplistic view does not capture the vast scope of factors that influence weight, such as hormones, metabolism, genetic factors, etc. (Liburd & Rothblum, 1995). Generations of conceptualizing obesity from a medical perspective has deeply ingrained these biases into Western society (Liburd & Rothblum, 1995). For example, if obese individuals are seen as responsible for their condition, justifiably, they are also stereotyped as lazy, weak-willed, self-indulgent, and immoral (Weiner, 1995). These stereotypes appear to be strongly engrained and easily provoked in observers (Teachman et al., 2003). Moreover, personal responsibility attributions tend to be associated with increased self-blame and internalization of weight bias among people who are overweight and obese (Pearl & Lebowitz, 2014; Tiggemann & Rothblum, 1997).

Self-Internalization

The negative messages associated with weight bias, implicitly or explicitly, may become incorporated into an individual's self-concept (Nussbaum, 1995). As weight bias occurs, prejudice may then be internalized into an individual's own perceptions, self-concept, and cognitions (Major et al., 2014; Ross, 1994). Participants with greater internalization of body-related messages endorsed higher levels of depression, anxiety, and poorer overall health (Hilbert et al., 2014; Puhl & Brownell, 2001).

Experiencing pressure to conform to an image ideal can also increase self-objectification (Durso & Latner, 2008) and internalization of stereotypes can negatively influence one's self worth and self-esteem (Corrigan et al., 2009; Watson et al., 2006). Instead of attributing the negative comment to a stereotype, when individuals categorized as overweight hear negative stereotypes, they attribute that feedback to their failure to maintain "normal" weight (Crocker, 1999). Once negative perceptions from others are internalized, they can then become incorporated into an obese individual's self-concept, as obese and overweight individuals can feel incompetent, and experience higher levels of self-hatred (Hilbert et al., 2014). Specifically, the internalization and attribution of personal responsibility appears to heighten the effects of weight bias and decrease health in overweight and obese people (Pearl et al., 2014). They are also more likely to have poor health outcomes, increased anxiety, decreased overall health, elevated depressive symptoms, (Hilbert et al., 2014), increased maladaptive eating patterns (Puhl et al., 2007), and poorer body satisfaction (Carels et al., 2010).

Body Dissatisfaction

Despite there being less research related to physical self-concept and body dissatisfaction in men, there appears to be supporting evidence that men do desire changes in their body

appearance (Muth & Cash, 2006). Gillen and Lefkowitz (2006) revealed that 41% of men in their sample wanted to be smaller, 35% were satisfied with their body, and 24% wanted to be larger. Experiences with weight teasing or internalization of specific societal-endorsed body ideals appear to influence individuals' own perceptions of their body. Boys who indicated a higher drive for muscularity were more likely to be engaging in activities to gain muscle mass (McCreary & Sasse, 2000). The boys who endorsed muscularity ideals boys also reported lower self-esteem and elevated depressive symptoms (McCreary & Sasse, 2000).

As discussed earlier, feeling dissatisfied with ones' body may contribute to low self-esteem, decreased physical self-concept, and depressive symptoms. Perception of one's body appears to be especially important in the relationship to negative psychological outcomes and depressive symptoms (e.g., Beesdo et al., 2009; Gadalla & Piran, 2008; Hoek et al., 2005; McCaulay et al., 2004; Luppino et al., 2010). In a study of 154 college men, reported body dissatisfaction was related to depressive symptoms. Moreover, after examining college men, Forrest and Stuhldreher observed a significant relationship between body dissatisfaction and depression for both binary genders (2007). McFarland and Kaminski (2008) corroborated this relationship in 340 undergraduate men, whose reported body image concerns were significantly related to depression, anxiety, and lower self-concept ratings. Additional research is needed to examine risk factors and protective factors of male body dissatisfaction, which has demonstrated a significant relationship to depressive symptoms and other adverse mental health outcomes (Van Den Berg, et al., 2007). Various protective factors may help to buffer the impact the negative correlates of body dissatisfaction or the effects of experiences and internalized of weight stigma.

Protective Factors

Self-Esteem

Self-esteem is discussed as the overall evaluation of self-worth and, more specific to particular domains, the self-evaluation of one own life's roles (i.e. student, spouse, friend, etc.; Simpson & Boyle, 1975). Obese individuals often show signs of negative self-esteem and self-stigma, the negative beliefs, and feelings about self (e.g., Puhl et al., 2007; Schwartz et al., 2006). Experiences of weight bias have been associated with low self-esteem and greater mental health concerns (Hilbert et al., 2014). The higher frequency of weight stigma and the internalization of weight stigma was also associated with decreased self-esteem (Pearl & Puhl, 2018; Wu & Berry, 2018).

Relatedly, individuals who indicated having a well-defined sense of self, reported less internalization of the appearance-ideal and indicated engaging in fewer appearance-related comparisons, than their counterparts who did not indicate having a clear sense of self (Vartanian & Dey, 2013). Moreover, male undergraduates (N = 166) who reported better understanding themselves were less likely to engage in social comparisons, which were related to depression and anxiety symptoms (Butzer & Kuiper, 2006). Positive self-esteem has consistently been demonstrated as a buffering effect on the impact of weight oppression and depressive symptoms, and therefore, the current study proposed self-esteem as a moderator of the relationship between and oppression and internalization. To further explore how positive phenomena may protect undergraduates against the potential negative effects of weight bias, which include weight internalization, body dissatisfaction, and depressive symptoms, the current study will also assess academic self-concept.

Academic Self-Concept

Academic self-concept represents how confident individuals feel about their own school-based, academic abilities, and competencies (Marsh & O'Neill, 1984). In one study, obese adolescent boys were nearly 1.5 times more likely to consider themselves poor students and 1.4 times more likely to expect to quit school (Falkner et al., 2001). Though academic self-concept has not been comprehensively explored as a protective factor for weight- related bias, academic self-concept has been discussed as a protective factor in buffering against poor self-image concerns and symptoms of depression. Among undergraduates, perceiving oneself as competent in school-related tasks is related to fewer reported depressive symptoms (McGregor & Kaminski, in press). In the same study of over 200 college men, academic self-concept was also positively related to other areas of self-concept (McGregor et al., 2018). Moreover, increased academic self-concept has been associated with academic achievement and performance (Marsh, 1990) and may influence overall self-esteem (Trautwein et al., 2006). Academic self-concept may then be helpful in contributing to improved overall self-concept and self-esteem, which has demonstrated a relationship to decrease anxiety and depressive symptoms (e.g., Dishman et al., 2006; Fathi-Ashtiani et al., 2007). Therefore, the current study proposes academic self-concept as a moderator of the relationship between body dissatisfaction and depression, as those with elevated self-concept in areas unrelated to their bodies may be helpful in buffering against depressive symptoms. Another aspect of self that has been associated with depressive symptoms and low self-esteem among overweight people is low social connectedness (McAdams & Bryant, 1987; Shaver & Buhrmester, 1983).

Social Connectedness

As noted previously, interpersonal relationships can be an influential, and sometimes negative, source of weight stigma (Puhl & Brownell, 2006). Social isolation and lack of social support has been well-documented in the research in people who are overweight or obese (e.g., Strauss & Pollack 2003). Obese adults reported avoiding situations where they perceived they would be stigmatized (Lewis et al., 2011), thus having a possible negative impact on their ability to feel connected. Social isolation and lack of social connectedness has consistently linked with negative mental health outcomes, such as anxiety, depressive symptoms, decreased well-being, and lower self-esteem (e.g., Argyle, 1987; Freedman, 1978; McAdams & Bryant, 1987; Shaver & Buhrmester, 1983; Weiss, 1973). Within interpersonal relationships, men and women report more positive body satisfaction when they are more authentic in relationships, compared to those who were less authentic in relationships (Gillen & Lefkowitz, 2006). Furthermore, feeling more socially connected and competent in one's ability to be in relationship with friends and family predicted fewer depressive symptoms, even among men who reported feeling negatively about their bodies (McGregor et al., 2018). Feeling more socially connected, therefore, may decrease the likelihood that a person who is dissatisfied with their body experiences elevated depressive symptoms. The current study proposes social connectedness as a moderator of the relationship between body dissatisfaction and symptoms of depression.

Statement of Purpose

Research addressing the weight-related factors that contribute symptoms of depression among college men has been limited. Furthermore, few researchers have examined specific pathways implicated in the relationship to depressive symptoms from a biopsychosocial perspective (see Appendix C). Thus, the current study aimed to extend the BMI, perception of

weight related messages, and symptoms of depression literature by testing the complex relationships between the variables proposed by Thompson et al. (1999), Tylka (2011), and McGregor and Kaminski (2020), and their role in the development of—or protection from—depressive symptoms. Specifically, with a biopsychosocial lens, a modified version of the Tripartite Influence Model focused on only the body fat pathway and additional protective factors will be tested (theoretical models discussed in Appendix C).

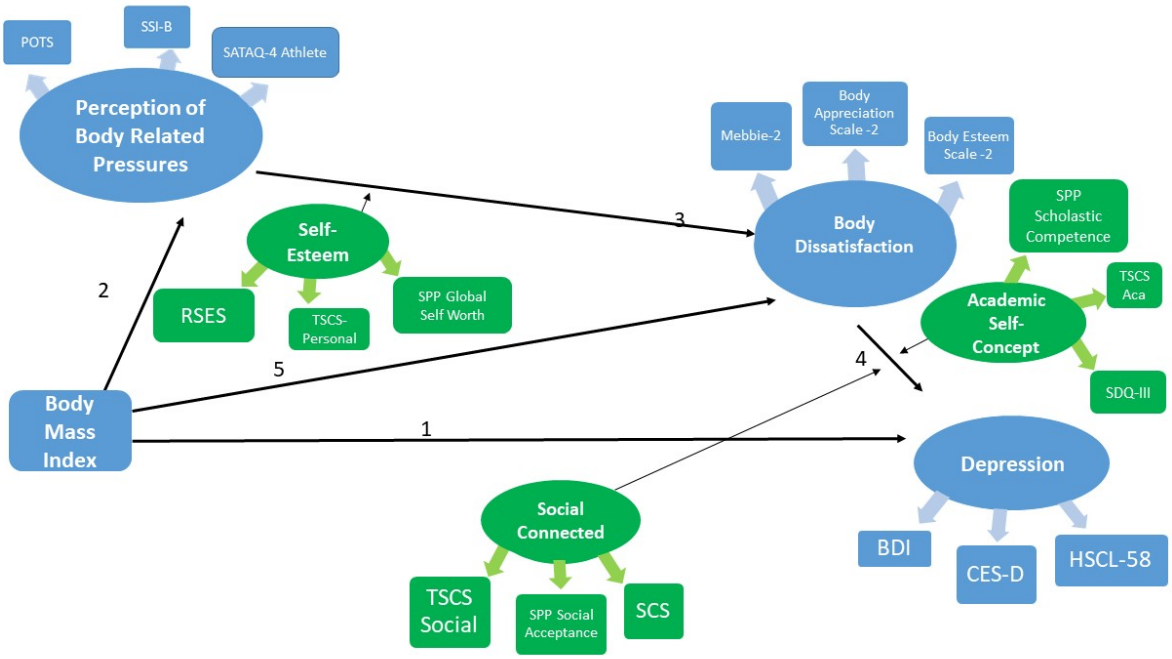

Figure 1. Proposed model.

Abbreviations for indicators are as follows, Perception of Teasing Scale (POTS), Stigmatizing Situations Inventory-Brief (SSI-B), Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ4), Body appreciation Scale – 2nd edition (BAS2), Male Eating Behavior and Body Image Evaluation-2 (MEBBIE-2), Body Esteem Scale (Body Esteem), Beck Depression Inventory II (BDI), Center for Epidemiological Studies Depression Scale Revised (CESD), and the Hopkins Symptom Checklist (HSCL58), Rosenberg Self-Esteem (RSES), Self-Perception Profile (SPP), Tennessee Self-Concept Scale 2nd Edition (TSCS), Self-Description Questionnaire III (SDQ), Social Connectedness Scale (Social Connectedness).

Hypotheses

1. Perception of weight and body related pressures and body dissatisfaction, partially mediate the relationship between BMI and depressive symptoms (See Paths 2, 3, and

4 in Figure 1); thus, BMI also directly predicts symptoms of depression (see Path 1 in Figure 1).

2. Perception of weight and body related pressures partially mediates the relationship between BMI and Body Dissatisfaction (See Paths 2, 3, and 5 in Figure 1).

3. Body Dissatisfaction mediates the relationship between Perception of weight and body-related pressures and Symptoms of Depression (See Paths 3 and 4 in Figure 1).

4. Body dissatisfaction, on its own, partially mediates the relationship between BMI and depressive symptoms (see Path 5).

5. Three protective factors were hypothesized as moderating relationships within the proposed model

6. Self-Esteem –Self-esteem dampens the relationship between perception of body-related pressures and body dissatisfaction such that men who experience weight pressures, those with higher self-esteem indicated less body dissatisfaction when compared to men with lower self-esteem (see Figure 1).

7. Academic Self-Concept – Academic self-concept dampened the relationship between body dissatisfaction and depressive symptoms; such that, for Men who feel dissatisfied with their bodies, those with a high sense of academic self-concept also reported lower depressive symptoms, compared to men who indicated feeling negatively about their academic self (see Figure 1).

8. Social Connectedness – Alternatively, social connectedness weakened the relationship between body dissatisfaction and symptoms of depression. Therefore, body satisfied men who feel socially connected report fewer depressive symptoms than body dissatisfied men who do not feel socially connected (see Figure 1).

METHOD

Participants

Participants (N = 169) were collected from a large public university in the southcentral United States. Three participants were removed due to identifying as "female" and 11 cases were removed due to missing data. To control for differing psychosocial factors experienced by low weight men (McCreary & Sadava, 2001; Tager et al., 2006), participants with BMI less than 18.5 were screened out of the analyses (N = 4). In addition, BMI misclassifies heavily muscled people as overweight (e.g., Romero-Corral et al., 2008). Men who indicated a strong desire (over 50%) to gain weight as fat (N = 2), were also screened out of the analyses, though these two men were also two of the men with underweight BMI. Changes to our sample were intended to increase the sample homogeneity, such that, any dissatisfaction with their bodies would not be due to thinness.

As a result, analyses were conducted with 151 participants. Male-identifying undergraduate students, mean age of 21.3 years (SD = 4.16; Range: 18-53; see Table 1) were recruited via a secure online system and offered course credit or extra credit in various undergraduate courses for participation. In terms of race/ethnicity, the participants were Asian/Asian American (n = 27, 17.9%), Black/African-American (n = 22, 14.6%), Caucasian/White (n = 57, 37.7%), Hispanic/Latino/ax (n = 28, 18.5%), Middle Eastern/Arab (n = 1, .7%), Biracial (n = 11, 7.3%), and Other (n = 3, 3.3%). Sexual orientation was indicated as predominantly heterosexual/straight (83.4%), with 1.3% of men identifying as asexual (n = 2), 5.3% as bisexual (n = 8), 2.6% as gay (n = 4), 4.0% as questioning (n = 6), and 3.3% as sexually fluid or other (n = 5). Across the classifications of Body Mass Index (BMI), 76% of the men were "normal" weight, 55% were "overweight", and 20% were "obese" (see Table 1).

Table 1

Demographics

		n	%
Age	18-25	133	88.1
	26-35	17	11.2
	>35	1	0.7
Ethnicity	Asian/Asian American	27	17.9
	Black/African-American	22	14.6
	Caucasian/White	57	37.7
	Hispanic/Latino/a/x	28	18.5
	Middle Eastern/Arab	1	0.7
	Biracial	11	7.3
Sexual Orientation	Asexual	2	1.3
	Bisexual	8	5.3
	Gay/Lesbian	4	2.3
	Heterosexual (Straight)	126	86.4
	Questioning	6	4.0
	Sexually Fluid	2	1.3
	Other	3	2.0
BMI	Normal	76	50.3
	Overweight	55	36.4
	Obese	20	13.2
Class Rank	Freshman	56	37.1
	Sophomore	32	21.2
	Junior	30	19.9
	Senior	27	17.9
	Other	6	4.0

Measures

Demographic Survey

After reading the informed consent and indicating their interest in the current study (Appendix D), participants spent about five minutes answering a demographic questionnaire

(Appendix E). Questions inquired about their age, race, socioeconomic status, year in school, education level, sexual orientation, past military experience, as well as self-estimates of their current weight and height, ideal weight, participation in organized sport, and typical workout schedule.

Table 2

Descriptive Statistics for Measured Variables

	α	*M*	*SD*	Min	Max
BMI Measured		25.86	4.87	18.62	44.97
BDI Total	0.91	10.28	8.84	0.00	37.00
CESD Total	0.94	15.62	13.06	0.00	48.00
HSCL58 Total Depression	0.86	17.81	5.81	38.00	81.00
POTS Total Weight Teasing	0.83	8.80	3.83	6.00	21.00
SATAQ4 Muscle/Athlete Total	0.87	13.73	3.24	5.00	20.00
SSI-B Total	0.86	9.72	10.89	1.00	60.00
BAS2 Total	0.95	35.93	8.56	12.00	50.00
MEBBIE2 BD Total	0.75	3.28	.67	1.25	4.75
Body Esteem Total	0.88	33.84	7.59	10.00	50.00
RSES Total	0.88	21.44	5.66	10.00	40.00
SPP Global Total	0.75	16.49	3.94	9.00	24.00
TSCS Personal Total	0.85	42.41	7.58	22.00	60.00
AcaSDQ III Total	0.81	54.82	9.77	20.00	80.00
SPP Scholastic Total	0.75	10.90	2.51	5.00	16.00
TSCS Academic Total	0.8	43.01	6.28	23.00	60.00
Social Connectedness Total	0.91	80.18	14.82	46.00	120.00
SPP Social Total	0.75	10.94	2.33	5.00	18.00
TSCS Social Total	0.81	43.30	6.60	29.00	60.00

Note. Abbreviations for indicators are as follows, Perception of Teasing Scale (POTS), Stigmatizing Situations Inventory-Brief (SSI-B), Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ4), Body appreciation Scale – 2nd edition (BAS2), Male Eating Behavior and Body Image Evaluation-2 (MEBBIE-2), Body Esteem Scale (Body Esteem), Beck Depression Inventory II (BDI), Center for Epidemiological Studies Depression Scale Revised (CESD), and the Hopkins Symptom Checklist (HSCL58), Rosenberg Self-Esteem (RSES), Self-Perception Profile (SPP), Tennessee Self-Concept Scale 2nd Edition (TSCS), Self-Description Questionnaire III (SDQ), Social Connectedness Scale (Social Connectedness). *p <.05, **p < .001

Perception of Body Pressures

Three measured variables served as indicator for the latent variable, perception of body pressures. These include the general weight teasing subscale of the Perception of Teasing Scale's (POTS), the brief version of the Stigmatizing Situations Inventory (SSI-B) and the Muscular/Athletic subscale of the Sociocultural Attitudes Toward Appearance Questionnaire SATAQ-4.

Perception of Teasing Scale

The Perception of Teasing Scale (POTS) is an 11-item self-report measure were used to asses each participant's experience of appearance related teasing (Thompson et al., 1995). Respondents rated each item on a Likert scale from *never* (1) to *always* (5). The two subscales of the POTS are General weight teasing and Competency teasing, only the former was used in the current study. The General weight teasing subscale was scored by summing the scores for each of its 6 items. Example items included "People made fun of you because you were heavy" or "People pointed at you because you were overweight." Internal consistency in the current study was demonstrated as good ($\alpha = .83$; see Table 2).

Stigmatizing Situations Inventory- Brief

The brief Stigmatizing Situations Inventory (SSI-B) narrowed 50 self-report items to 10 items (Vartanian, 2015). The original SSI was developed for women and men. It contained 11 subscales assessing stigma due to one's family, being stared at, negative assumptions being made about the individual, loved ones being embarrassed by the individual's size, etc. (Vartanian, 2015). The Brief SSI contains one item from each of the subscales. Example questions included "Overhearing other people making rude remarks about you in public" or "Having people assume you overeat or binge eat because you are overweight" (Vartanian, 2015). Participants rated the

lifetime frequency of how often they experienced each item from 0 (*Never*) to 9 (*Daily*). Internal consistency in the current study was demonstrated as good (α = .86; see Table 2).

Sociocultural Attitudes Toward Appearance Questionnaire-4 (SATAQ-4)

The SATAQ-3 (Thompson et al., 2004) is a 30-question inventory that assesses societal and interpersonal factors of appearance ideals. The SATAQ-4 is the revised measurement that addressed limitations of the 3rd version (Schaefer et al., 2015). The 22 self-report items were responded to on a 5-point Likert scale that ranges from *definitely disagree* to *definitely agree*. There are 5 factors assessed: Thin/Low body fat, Internalization, Muscular/Athletic, Family pressures, Peer pressures, and Media pressures. For the current study, the subscale of Muscular/Athletic ideal was utilized. Internal consistency in the current study was demonstrated as good for the Muscular/athletic (α = .87) subscale.

Body Dissatisfaction

Participant's Body Dissatisfaction was comprised of three indicators. These were the Body Appreciation Scale, 2nd version, (BAS-2), Male Eating Behavior and Body Image Evaluation-2 (MEBBIE-2) Body Dissatisfaction Scale, and Body Esteem Scale Revised (BES-R).

Body Appreciation Scale (BAS-2)

The Body Appreciation Scale-2 (BAS-2) is based on the Body Appreciation Measure that assesses individuals' acceptance of and respect for their own bodies (Avalos et al., 2005). The original BAS was revised to eliminate sex-specific questions and wording (Tylka & Wood-Barcalow, 2015). Additional items were also added to be more consistent with positive body image research (Tylka & Wood-Barcalow, 2015). The BAS-2 has 10 self-report items, where

respondents rated each item on a Likert scale from 1 (*never*) to 5 (*always*). The total score was derived by calculating a mean score, with higher scores reflecting a greater appreciation for a participant's own body (Tylka & Wood-Barcalow, 2015). The current study demonstrated excellent internal consistency (α = .95; see Table 2).

Male Eating Behavior and Body Image Evaluation-2 (MEBBIE-2)

Participants completed the MEBBIE-2, assessing men's attitudes and behaviors pertaining to exercise, body image, and eating (Kaminski et al., 2005). Each item was rated on a Likert scale from 1 to 6. For the first part of the measure descriptors range from *Never* (1) to *Always* (6), while the second part ranges from *Strongly Disagree* (1) to *Strongly Agree* (6). For the current study, the Body Dissatisfaction subscale scores were used, which is comprised of four items. After reverse scoring relevant items, the mean of the items was calculated and used as the scale score. Higher scores indicated stronger endorsement of body dissatisfaction. Example questions included "My body shape is pleasing to me" and "My body is muscular enough." Internal consistency in the current study was demonstrated as acceptable (α = .75; see Table 2).

Body Esteem Scale-Revised (BES-R)

Participants also completed the Body Esteem Scale (BES-R; Frost et al., 2018), a 28 self-report item measure. Participants rated various aspects of their own body on a 5-point scale. For men, the body esteem dimensions include Sexual Attractiveness, Upper Body Strength, and Physical Condition (Frost et al., 2018). The current study used the Physical Condition subscale. Areas of the body and physical efficacy, such as, figure/physique, physical stamina, and agility, were rated on a Likert scale from 1 (*Have Strong Negative Feelings*) to 5 (*Have Strong Positive Feelings*). Cronbach's alpha in the current study was demonstrated as good (α = .88; see Table 2).

Body Mass Index

BMI was calculated using each participant's measured height and weight (i.e. Weight (kg) / Height $(m)^2$; CDC, 2016). Participants removed their shoes and jackets before standing against a wall marked with feet and inches where a trained research assistant recorded their height. Then each man stepped onto a scale to obtain their weight. This process was repeated and the average of each of the two measurements were used for height and weight. For individuals who completed the study online only, their reported height and weight were corrected using regression analyses based on the data obtained from in-person participants.

Depressive Symptoms

Three self-report measurements comprised the latent variable of depressive symptoms. Specifically, we used the Beck Depression Inventory (BDI), the Center for Epidemiological Studies Depression Scale Revised (CESD-R), and the Hopkins Symptom Checklist (HSCL-58).

Beck Depression Inventory (BDI-II)

The BDI-II is a 21-item self-report questionnaire that measures attitudes and symptoms of depression (Beck et al., 1996). Participants were asked to rate each item on a 4-point Likert scale from 0 *when the individual is not experiencing the symptom* and 3 *when the individual reports experiencing the symptom all the time*. Examples items discussed depressive symptoms, such as how often the respondent feels sad, feels as if they are a failure, gets satisfaction out of tasks, etc. The overall BDI score was totaled by adding the score for each item, with scores more than 20 indicating moderate depression. The current study demonstrated excellent internal consistency ($\alpha = .91$; see Table 2).

Center for Epidemiological Studies Depression Scale Revised (CESD-R)

Participants responded to the CESD-R's 20 items measuring nine different types of depressive symptoms as defined by the American Psychiatric Association Diagnostic and Statistical Manual, fifth edition (Eaton et al., 2004). The DSM-V identifies sadness, loss of interest, sleep difficulties, concentration concerns, feelings of worthlessness, fatigue, agitation, and suicidal ideation as 9 types of depressive symptoms. Example items include "My appetite was poor," "I could not shake off the blues," and "My sleep was restless." Each respondent rated each item based on how often the symptom has occurred in the last week: not at all or less than 1 day, 1-2 days, 3-4 days, 5-7 days, or nearly every day for 2 weeks. The endorsed answer was then be given a score with *not at all* corresponding with 0, *1-2 days* with 1, *3-4 days* with 2, *5-7 days* with 3 and *nearly every day for 2 weeks* with 3. The total CESD-R was calculated by totaling the scores for each item, with scores above 16 indicating possible major depressive episode. Cronbach's alpha in the current study was demonstrated as excellent ($\alpha = .94$; see Table 2).

Hopkins Symptom Checklist (HSCL-58)

Participants reported their symptoms of depression and other types of psychological distress on the Hopkins Symptom Checklist (HSCL; Derogatis et al., 1971; Derogatis et al., 1974). Respondents were asked to reflect how they have felt over the past seven days and then rated themselves on each symptom on a 4-point likert scale of distress between 1 (*not at all*) to 4 (*extreme distress*). Responses were scored on five underlying dimensions, somatization, obsessive-compulsive, interpersonal sensitivity, anxiety, and depression. For the current study, the total score for the 11-question Depression symptoms dimension was used. Example questions

include, “Poor appetite,” “Feeling blue,” and “Feeling no interest in things.” The current study demonstrated good internal consistency (α = .86; see Table 2).

Self-Esteem

Rosenberg Self-Esteem

Self-esteem was measured by Rosenberg’s (1965) Self-Esteem Scale (RSES). The RSES is a 10-item self-report measure to assess a one’s own overall evaluation their worthiness as a human being (e.g., “I feel that I’m a person of worth, at least on an equal basis with others”). Responses were answered based on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The RSES consists of two subcomponents of self-competence (i.e., feelings of efficacy) and self-liking (i.e., feelings of acceptance; Rosenberg, 1965). Internal consistency in the current study was demonstrated as good (α = .88; see Table 2).

Tennessee Self-Concept Scale

Self-esteem was also assessed using the 82-item Tennessee Self-Concept Scale 2nd edition (TSCS-2) measure, which measured an individual’s self-defined feelings of identity based on actions, preferences, and feelings. The TSCS measures six different facets of self-concept (moral., social., personal., physical., academic/work, and family) individuals indicated how they feel about themselves using a 5-point Likert scale from 1 (*always false*) to 5 (*always true)* (Fitts & Warren, 1996). The three subscales utilized in the current study measured specific aspects within an individual’s self-worth and identity, where higher scores indicate greater self-concept in the respective area.

Personal (PER) assessed self-esteem and evaluated an individual’s self-evaluation of personal worth and sense of adequacy as a person. Items assessing an individual’s sense of

personal worth included “I am a nobody” and “I am just as nice as I should be” (Fitts & Warren, 1996). Academic/Work (ACA) was used as an assessment of academic self-concept, discussed below, and examined an individual’s self-reported view of their adequacy in school or work settings and how they feel their capabilities are viewed by others in a work environment. Items include “Other people think I am smart” and “I do not know how to work well” (Fitts & Warren, 1996). Social (SOC) quantified how an individual perceives their relation to others and their adequacy in social interactions and measured social connectedness, as discussed below. Higher scores reflected cooperative, outgoing, and friendly qualities. Items include “I get along well with other people” and “I am mad at the whole world” (Fitts & Warren, 1996). Internal consistency in the current study was demonstrated as good across all subscales (α = .80-.86; see Table 2).

Self-Perception Profile for College Students

Furthermore, the Self-Perception Profile for College Students (SPP-College Students; Neemann & Harter, 1986) measured self-esteem, as well as academic self-concept and social connectedness. The SPP-College Students is a 54-item self-reported measure that assessed perceptions of oneself along various domains. Each item asked the participant to indicate which of the two types of individuals they are most similar to, followed by whether that description is “sort of true” or “really true” for them. Moreover, items were then rated from 1 (*least true self-judgment*) to 4 (*most true self-judgment*). The current study utilized three domains: Global Self-worth examined one’s general feeling about themselves, such as liking the kind of person one is, and liking the way one is living life. Example item included “Some students usually like themselves as a person but other students often do not like themselves as a person” (Neemann & Harter, 1986). Scholastic Competence measured self-reported perceived competence of

mastering coursework and homework and was utilized to assess academic self-concept, as discussed below. An example item included “Some students feel confident they are mastering their coursework BUT Other students do not feel so confident” (Neemann & Harter, 1986). Social Acceptance measured social connectedness, as discussed below, and explored how one feels about their own social skills and relationships. An example item included “Some students like the way they interact with other people BUT Other students wish their interactions with other people were different” (Neemann & Harter, 1986). SPP subscales demonstrated the acceptable internal consistency across all three subscales used in the current study (α = .76 - 78; see Table 2).

Academic Self-Concept: Self-Description Questionnaire III

In addition to the TSCS-2 Academic Self-Concept subscale and the SPP-College students Scholastic Competence subscale, as were both described earlier, the Self-description-III was utilized to assess self-perception of one’s academic competence (Marsh & O'Neill, 1984). The General School subscale contained 10 items measured on an 8-point Likert-type scale from 1 (*definitely false)* to 8 *(definitely true*). Example items included “I enjoy doing work for most academic subjects” and “I learn quickly in most academic subjects” (Marsh & O'Neill, 1984). Internal consistency in the current study was demonstrated as good (α = .81; see Table 2).

Social Connectedness: Social Connectedness Scale – Revised

In addition to the TSCS-2 Social Self-Concept subscale and the SPP-College students Social Acceptance subscale, belonging and social connectedness was assessed utilizing the Social Connectedness Scale – Revised (SCS-R; Lee et al., 2001). The original SCS scale was revised to address concerns about negative response bias and question framing. Respondents rated each of 20 statements, on a Likert scale 1 (*Strongly Disagree*) to 6 (*Strongly Agree*).

Example statements included “I fit in well in new situations” and “I feel close to people.” The total score was calculated by the combined sum of all the items, with higher scores indicating more feelings of social connectedness. Internal consistency in the current study was demonstrated as excellent ($\alpha = .81$; see Table 2).

Power Analysis

A power analysis was conducted using an alpha level of .05, a medium effect size of .15 (Cohen, 1988), and 19 predictors, including the latent variable’s measures, in G*Power (Faul et al., 2014). The results indicated that a sample size of 145 men would be adequate to detect the desired effect at a power of .80.

Procedure

Approval from the UNT Institutional Review Board was obtained. Then participants from psychology courses were recruited through the psychology online system, where students signed up to participate for course credit. Participants from outside of psychology were also recruited by asking instructors of large classes in other disciplines to announce the study with the raffle as an incentive, as well as contacting UNT student organizations.

Participants scheduled a time where each person was able to attend a research appointment to complete various measures and size assessments. Each participant spent 45-90 minutes completing various self-report measures and demographic questions. After completion of the self-report measures, each participant was individually taken to a research office where their measurements were privately recorded. After completing the study, participants received a debriefing letter that described the purpose of the study and provided referral information for men with body image or depressive concerns (Appendix F). Furthermore, each participant also received course credit or extra credit in their respective courses and entry into a raffle. Due to

UNT's closure during the Spring 2020 process, participants who completed the research study after March completed the entire research protocol online.

Data Analysis

Prior to data analysis, procedures for examining accuracy of data, missing values, and outliers were utilized. To assess for data entry errors and missing values, frequency tables were generated. The data was cleaned using practices discussed by Field (2009), and therefore, 11 cases that contained more than 5% missing items were deleted from the analyses. Furthermore, participants who identified themselves as "female" were also removed from the analyses (n = 3). Ipsative imputation was then be used to replace missing information in a random fashion (Schafer & Graham, 2002; Schlomer, Bauman, & Card, 2010).

The assumptions of structural equation modeling (SEM) were also assessed before data analysis, including univariate and multivariate normality, multicollinearity, homoscedasticity, and linearity of relationship between independent and dependent relationship. Normality was assessed by examining histograms, skew, and kurtosis. The variation inflation factor (VIF) and tolerance were utilized as indicators to confirm non-collinearity between the predictors. Homoscedasticity and linearity were also examined using scatterplots.

To conduct the structural equation modeling (SEM) analysis, AMOS (IBM, 2019), a statistical program, was used. SEM is a multivariate statistical technique that examines relationships between observed variables and latent variables based on a theoretical model (Martens, 2005). Latent variables are underlying theoretical constructs, whereas observed variables are measured. The relationships between observed and latent variables were defined *a priori* using a measurement model and a theoretical model framework (see Figure 1). A

confirmatory factor analysis (CFA) was used to test how adequately the observed variables measured the latent constructs, thus assessing the measurement model.

Then, the latent variable structural model was tested to examine the power (i.e., direction, strength, and significance) of the hypothesized mediational model. The goodness of fit of the proposed model was examined in AMOS using chi-square values (Weston & Gore, 2006). Modification indices were used to add direct effects to create a revised optimal model. Once the final model was established, the hypothesized moderators or protective factors: self-esteem, academic self-concept, and social connectedness, were tested. Each moderator whose hypothesized target path remained was entered, one at a time, into the model to assess for potential moderating effects.

Measurement Model

In the measurement model, each latent variable had three indicator variables. The fit indices, squared multiple correlations, factor loadings of the measurement model were examined.

Structural Model

The model was entered into and assessed for fit using AMOS. Overall fit and direct effects were examined within the model, as well the direction and strength of each relationship. The variance accounted for by predictors were also examined. The strength, direction, and significance of indirect effects was also assessed for each proposed mediation.

RESULTS

Baron and Kenny (1986) established three conditions that are necessary prior to a mediation analysis, including a significant association between the predictor and the outcome variables, a significant association between the predictor and the mediating variables, and a significant association between the mediating variables and the outcome variables. To meet the conditions for mediation and moderation, bivariate correlations were conducted to assess for significant relationship between all latent variables (LVs; Baron & Kenny, 1986; see Table 3).

Table 3

Latent Variable Correlations

	Perceived Body Pressures	Body Dis-satisfaction	Depressive Symptoms	Self Esteem	Academic Self-Concept	Social Connected-ness
Perceived Body Pressures	-					
Body Dissatisfaction	.80**	-				
Depressive Symptoms	.67**	.75**	-			
Self Esteem	-.58**	-.86**	-.82**	-		
Academic Self-Concept	-.25**	-.42**	-.51**	.73**	-	
Social Connectedness	-.22**	-.60**	-.61**	.89**	.75**	-

** $p < .001$

All mediating variables were significantly correlated to depressive symptoms (see Table 3), with the highest correlation existing among body dissatisfaction and depressive symptoms ($r = .80$, $p < .001$). Moderating variables (i.e., self-esteem, academic self-concept, and social-connectedness) were also examined (see Table 3). BMI was significantly relate to perceived body messages ($r = .66$, $p < .001$), body dissatisfaction ($r = .33$, $p < .001$), and depressive

symptoms (r = .34, p < .001). Self-esteem demonstrated significant relationship with experiences of perceived body messages and body dissatisfaction, the latent variables self-esteem was proposed to moderate (see Table 3). Further, both academic self-concept and social-connectedness also demonstrated a significant relationship with both body dissatisfaction and depressive symptoms.

Preliminary statistical analyses were conducted to examine the potential effects of demographic variables on depressive symptoms. There were no significant differences in BMI across any demographic variable. Furthermore, differences in depressive symptoms across racial/ethnic differences were not significant. With regard to sexual orientation, however, reported depressive symptoms varied significantly (F(6, 144) = 9.65, p < .001). Post hoc analysis noted significant differences in depression symptoms between men who identified as straight and those who identified as gay, bisexual, or "other," such that sexual minority men reported higher depressive symptoms. . Men who reported identifying as "Other" (i.e., questioning, sexually fluid, asexual, or other) also reported higher depressive scores then men who identified as straight. Multiple response options were combined into "Other" to examine differences with an ANOVA. "Other" men. Significant differences will be considered in the interpretation of the current study's findings and acknowledged as a factor of future implications.

To assess for normality, each measured variable's skew and kurtosis were calculated. Scores that fell outside -2 to +2 for kurtosis and -1 to +1 for skew were further explored. SSI-B indicated a skew of 1.89 and a kurtosis of 3.96. Skew and kurtosis are heavily impacted by sample size, therefore, the limitations of the SSI-B will be noted in the current study's limitations. The variation inflation factor (VIF) factors were compared to a cut off score of 2.5 to assess for multicollinearity. All examined variables demonstrated acceptable multicollinearity.

Homoscedasticity and linearity were examined using scatterplots. Overall, the assumptions for SEM were not violated.

Measurement Model

The initial measurement model indicated adequate overall fit (see Table 4). The resulting chi-square indicated there was a problem with the model's fit, $\chi^2(138) = 266.43$, $p < .001$ (see Table 4). However, criticism of the chi-square test is that it is heavily influenced by sample size. To correct for sample size, the CMIN/DF divides the CMIN by the degrees of freedom. The revised model's CMIN/DF was 1.93 suggesting reasonable fit. Other fit indices compare the current model's fit with a null model. TLI, which is adjusted for model complexity, indicated adequate fit., TLI = .90. Similarly, CFI also indicated adequate fit, CFI = .91. The root mean square of approximation (RMSEA) was indicative of acceptable fit, RMSEA = .07 (see Table 4).

Table 4

Confirmatory Factor Analysis Model Fit

	CMIN	*p*	CMIN/DF	CFI	TLI	RMSEA
Initial Model	266.43	<.001	1.93	.91	0.90	0.07

Note. CMIN = Minimum discrepancy, CFI = Comparative fit index, TLI = Tucker-Lewis coefficient, RMSEA = Root mean square error of approximation

The CFA, using maximum likelihood method, demonstrated that the observed variables were significantly loaded onto each of the latent variables. All subscales were significant predictors of the corresponding latent variable (see Table 5; see Figure 2). The strongest loadings were POTS Weight Teasing onto perception of body pressures ($\beta = 1.01$, $p < .001$), TSCS Personal onto self-esteem ($\beta = .91$, $p < .001$), and BDI on depressive symptoms ($\beta = .93$, $p < .001$).

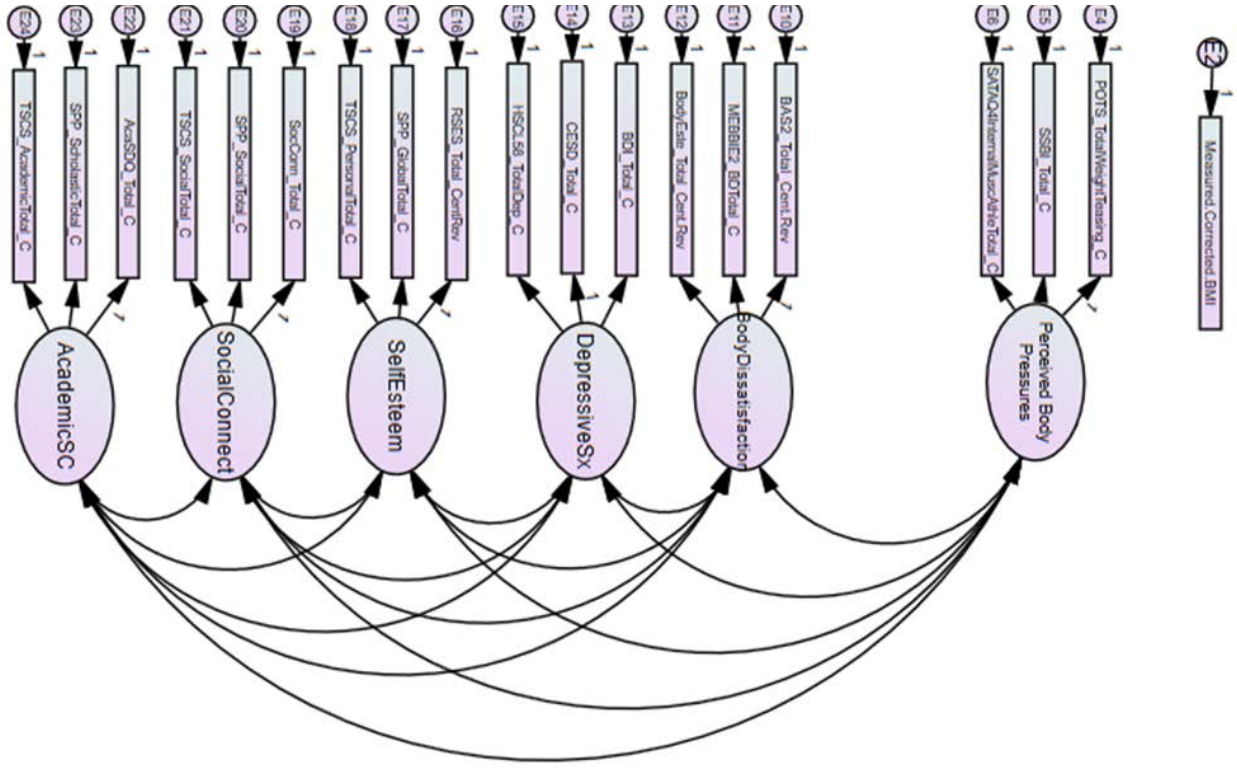

Figure 2. Measurement model.

Abbreviations for indicators are as follows, Perception of Teasing Scale (POTS), Stigmatizing Situations Inventory-Brief (SSI-B), Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ4), Body appreciation Scale – 2nd edition (BAS2), Male Eating Behavior and Body Image Evaluation-2 (MEBBIE-2), Body Esteem Scale (Body Esteem), Beck Depression Inventory II (BDI), Center for Epidemiological Studies Depression Scale Revised (CESD), and the Hopkins Symptom Checklist (HSCL58), Rosenberg Self-Esteem (RSES), Self-Perception Profile (SPP), Tennessee Self-Concept Scale 2nd Edition (TSCS), Self-Description Questionnaire III (SDQ), Social Connectedness Scale (Social Connectedness).

Table 5

Measurement Model Regression Weights

Regression Weights		*B*	*b*	S.E.	*p*
BMI		0.84	4.095		<.001**
Perceived Body Pressures	POTS Total Weight Teasing	1.01			<.001**
	SSBI Total	.57	1.6	.37	<.001**
	SATAQ4 Muscle/Athlete Total	.12	.03	.07	.050*
Body Satisfaction	BAS2 Total	.84			<.001**
	MEBBIE2 BD Total	.62	.23	.03	<.001**
	Body Esteem Total	.70	.74	.08	<.001**

(table continues)

Regression Weights		*B*	*b*	S.E.	*p*
Depressive Symptoms	BDI Total	.93	.92	.10	<.001**
	CESD Total	.68			
	HSCL58 Total Depression	.77	.50	.06	<.001**
Self-Esteem	RSES Total	.83			
	SPP Global Total	.67	.56	.06	<.001**
	TSCS Personal Total	.92	1.48	.10	<.001**
Academic Self-Concept	AcaSDQ Total	.71			
	SPP ScholasticTotal	.61	.22	.03	<.001**
	TSCS AcademicTotal	.84	.76	.10	<.001**
Social Connectedness	Social Connectedness Total	.83			
	SPP SocialTotal	.20	.04	.02	.022*
	TSCS SocialTotal	.86	.47	.04	<.001**

Note. Abbreviations for indicators are as follows, Perception of Teasing Scale (POTS), Stigmatizing Situations Inventory-Brief (SSI-B), Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ4), Body appreciation Scale – 2nd edition (BAS2), Male Eating Behavior and Body Image Evaluation-2 (MEBBIE-2), Body Esteem Scale (Body Esteem), Beck Depression Inventory II (BDI), Center for Epidemiological Studies Depression Scale Revised (CESD), and the Hopkins Symptom Checklist (HSCL58), Rosenberg Self-Esteem (RSES), Self-Perception Profile (SPP), Tennessee Self-Concept Scale 2nd Edition (TSCS), Self-Description Questionnaire III (SDQ), Social Connectedness Scale (Social Connectedness). *p <.05, **p < .001

Structural Model

After assessing the measurement model, the theoretical model's path coefficients were examined. To test the modeled hypothesis that relationship between BMI and depressive symptoms is mediated by perception of body related pressures and body dissatisfaction, three paths were tested (Figure 1). An error term was added to each of the latent variables in the model and indirect, direct, and total effects were generated. Furthermore, analyses produced standardized estimates and squared multiple correlations. Latent variables were significantly related to each of the other latent variables. The insignificant path five between BMI and body dissatisfaction was removed (see Figure 1). After trimming the insignificant pathway, the revised

model indicated good fit $\chi^2(32) = 41.91$, p =.113; CMIN/DF = 1.31; TLI = .97; CFI = .98; RMSEA = .05 (see Figure 3).

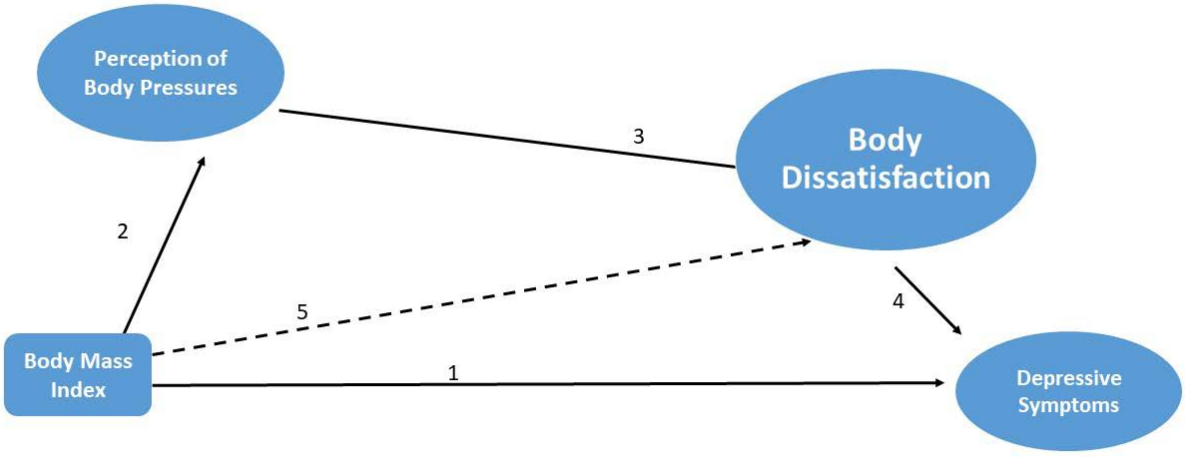

Figure 3. Revised mediation model.

All the path coefficients were in the hypothesized direction (see Table 6). Consistent with hypotheses, BMI, itself, was a significant predictor of depressive symptoms (*b* = .26, *SE* = .14, *p* = .05). Both of the proposed mediators of the relationship between BMI and depressive symptoms were significant (see Table 6).

Table 6

Mediation Model Direct Effects

Regression Weights	*B*	*b*	S.E.	C.R.	*p*
Perception Body Pressures <--- BMI	.57	0.41	.06	7.39	< .001*
Body Dissatisfaction <--- Perception Body Pressures	.53	1.08	.22	4.97	< .001*
Depressive Sx <--- Body Dissatisfaction	.65	.84	.14	5.82	<.001*
Depressive Sx <--- BMI	.14	.26	.14	1.78	.050*

*p <.001

Results suggested a non-significant pathway from BMI to body dissatisfaction. Further exploration noted that the relationship between BMI and body dissatisfaction became insignificant upon the entry of perception of body pressures into the model. Therefore, perception of body pressures fully mediated the relationship between BMI and body dissatisfaction. Preacher and Hayes (2008) indicated that standardized indirect effects are the index of mediation and bias-corrected bootstrap analyses produced indirect effects for each mediation. BMI's standardized indirect effect on body dissatisfaction, through perceived pressures, was significant (β = .30, CI [.178, .455], p = .003). As BMI increased 1 standard deviation, body dissatisfaction increased .30 standard deviation. Men with higher BMI reported an increase in perception of image pressures, which mediated the relationship to elevated body dissatisfaction compared to men with lower BMI. Moreover, BMI, itself, significantly predicted perception of body related pressures (b = .41, SE = .06, p < .001).

Similarly, perception of experiencing pressure related to one's body significantly predicted body dissatisfaction (b = .43, SE = .06, p < .001; see Table 6). Predictors accounted for 32.3% of the variance in perceived pressures (R^2 = .32) and 28.2% of the variance in body dissatisfaction (R^2 = .28). As men reported increasing perceptions of body-related pressures, they also reported higher levels of body dissatisfaction. Significantly, perception of pressures' standardized indirect effect on depressive symptoms, through body dissatisfaction, was significant (β = .35, CI [.204, .525], p = .004). As perception of body related messages increased body-related ideals increased 1 standard deviation, depressive symptoms increased .35 standard deviations. Therefore, body dissatisfaction significantly mediated the relationship between perception of body-ideal pressures and depressive symptoms. The mediation of perceived

pressures and depressive symptoms by body dissatisfaction demonstrated the strongest indirect effect.

Furthermore, body dissatisfaction was a significant predictor of depressive symptoms (b = .84, SE = .14, $p < .001$) and was the strongest direct predictor in the model (see Table 6). Moreover, all predictors of depressive symptoms accounted for 49.9% of the variance (R^2 = .50). Men with higher levels of body dissatisfaction reported more depressive symptoms than their peers who experience less dissatisfaction with their body.

Moderated Mediation

In each of the three moderations, the main effects of the latent construct and the proposed protective factor were all significant predictors. The interaction between perception of body pressures and self-esteem on body dissatisfaction, however, was not significant. Alternatively, the inclusions of the interaction of body dissatisfaction with both academic self-concept and social-connectedness were also significant.

Self Esteem

Specifically, results of the self-esteem's moderation of the relationship between perceived body pressures and body dissatisfaction revealed a significant main effect of self-esteem ($p < .001$). For every 1 standard deviation increase in self-esteem there was a .94 decrease in reported body dissatisfaction (b = -1.22, SE = .13; see Table 7). In addition, perceived body pressures was also a significant main effect, b = .42, SE = .11, $p < .001$. However, the interaction term of self-esteem and perceived body pressures was not significant (p = .862; see Table 7). Therefore, self-esteem did not significantly moderate the relationship between perceived body pressures and body dissatisfaction. Despite the magnitude of perceived body pressures, men with higher self-esteem indicated less internalization of male-body ideals.

Table 7

Moderation Results Testing Self-Esteem, Academic Self-Concept, and Social Connectedness as Moderators

		B	*b*	*SE*	C.R.	*p*
Self-Esteem	Self Esteem Main Effect	-.85	-1.56	.20	-7.96	<.001***
	Weight Bias Main Effect	.40	1.04	.19	5.54	<.001***
	Weight Bias x Self-Esteem interaction	-.06	-.06	.07	-.78	.463
Academic Self-Concept	Academic Self-Concept Main Effect	-.36	-.49	.10	-4.80	<.001***
	Body Dissatisfaction Main Effect	.49	.55	.11	5.17	.004**
	Body Dissatisfaction x Academic SC interaction	-.15	-.03	.01	-2.18	.030*
Social Connectedness	Social Connectedness Main Effect	-.48	-.35	.06	7.64	<.001***
	Body Dissatisfaction Main Effect	.34	.39	.10	3.92	<.001***
	Body Dissatisfaction x Social Connectedness interaction	-.16	-.01	.01	-2.30	.022*

* p <.05. ** p <.01. *** p <.001

Academic Self-Concept

Academic self-concept demonstrated a significant main effect, b = -.46, SE = .10, p < .001, such that men with higher academic self-concept indicated fewer depressive symptoms than men who reported lower academic self-concept (see Table 7). Specifically, as academic self-concept increased 1 standard deviation, depressive symptoms decreased .34 standard deviation. Body dissatisfaction was also a significant main effect, b = .65, SE = .12, p < .004. The interaction term of body dissatisfaction and academic self-concept was significant (p = .018; see Table 7). Therefore, academic self-concept was a significant moderator of the relationship between body dissatisfaction and depressive symptoms, such that men, who felt negatively about their bodies, tended to report less depressive symptoms if they were felt positive about their academic abilities than if they had a negative academic sense of self (see Figure 4 for how the moderator was assessed in AMOS).

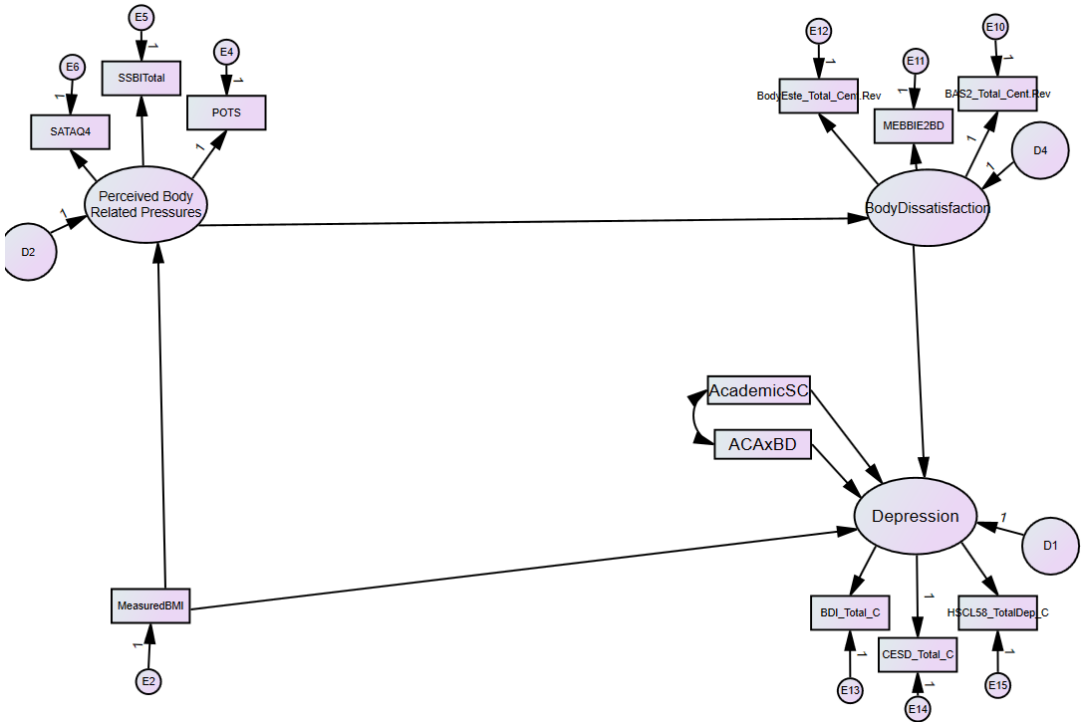

Figure 4. Testing academic self-concept as a moderator of the relationship between body dissatisfaction and depressive symptoms.

Abbreviations for indicators are as follows, Perception of Teasing Scale (POTS), Stigmatizing Situations Inventory-Brief (SSI-B), Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ4), Body appreciation Scale – 2nd edition (BAS2), Male Eating Behavior and Body Image Evaluation-2 (MEBBIE-2), Body Esteem Scale (Body Esteem), Beck Depression Inventory II (BDI), Center for Epidemiological Studies Depression Scale Revised (CESD), and the Hopkins Symptom Checklist (HSCL58), Rosenberg Self-Esteem (RSES), Self-Perception Profile (SPP), Tennessee Self-Concept Scale 2nd Edition (TSCS), Self-Description Questionnaire III (SDQ), Social Connectedness Scale (Social Connectedness).

Social Connectedness

Specifically, results of the social connectedness moderation of the relationship between body dissatisfaction and depressive symptoms revealed a significant main effect of social connectedness (b = -.33, SE = .06, p < .001; see Table 7). For every 1 standard deviation increase in social connectedness there was a .46 standard deviation decrease in reported depressive symptoms. Body dissatisfaction was also a significant main effect (b = .49, SE = .11, p < .001; see Table 7). Furthermore, the interaction term of body dissatisfaction and social connectedness was significant (p < .001). Social connectedness thus significantly moderated the relationship between body dissatisfaction and depressive symptoms. As hypothesized, among men who feel negatively about their body, men tended to report fewer depressive symptoms if they were felt positive their social connection than if they perceived themselves to have low social connectedness (see Figure 5 for how the moderator was assessed in AMOS).

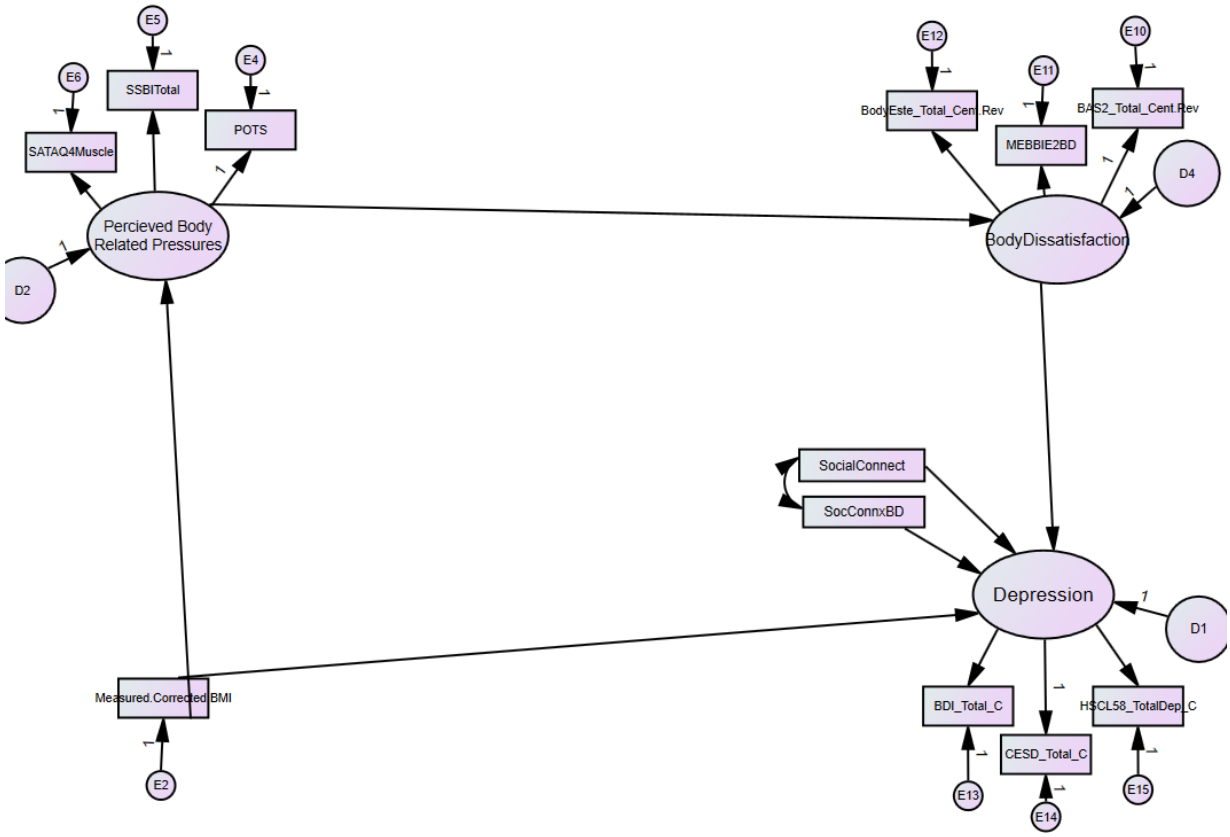

Figure 5. Testing social connectedness as a moderator of the relationship between body dissatisfaction and depressive symptoms.

Abbreviations for indicators are as follows, Perception of Teasing Scale (POTS), Stigmatizing Situations Inventory-Brief (SSI-B), Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ4), Body appreciation Scale – 2nd edition (BAS2), Male Eating Behavior and Body Image Evaluation-2 (MEBBIE-2), Body Esteem Scale (Body Esteem), Beck Depression Inventory II (BDI), Center for Epidemiological Studies Depression Scale Revised (CESD), and the Hopkins Symptom Checklist (HSCL58), Rosenberg Self-Esteem (RSES), Self-Perception Profile (SPP), Tennessee Self-Concept Scale 2nd Edition (TSCS), Self-Description Questionnaire III (SDQ), Social Connectedness Scale (Social Connectedness).

DISCUSSION

The purpose of this study was to examine weight-related factors that contribute to depressive symptoms among undergraduate men using structural equation modeling, as well as exploring possible protective factors buffering men against body dissatisfaction and/or depressive symptoms. Specifically, perceived pressures of body-related messages and body dissatisfaction were proposed as mediators of the relationship between BMI and depressive symptoms. Overall, the revised model demonstrated good fit (see Figure 3). In the revised model, nearly all of the mediation hypothesis were supported and two of the three proposed moderating hypothesis were also supported. Due to the cross-sectional nature of analyses, inverse relationships must also be considered. First, the predicted directions will be interpreted.

BMI, in and of itself, predicted experiences of depressive symptoms, supporting existing research that college students who are overweight have emotional and social difficulties indicative of depressive symptoms (e.g., Adams & Colner, 2008; Desai et al., 2008; Luppino et al., 2010). Furthermore, perceived body-related pressures fully mediated the relationship between BMI and body dissatisfaction. The process of experiencing weight related pressures, which can result in body dissatisfaction, appears to have critical elements that place men at risk of symptoms of depression. One possible interpretation may be that perceived body pressures may decline self-esteem, which then influences body perceptions in a manner separate from BMI. Tylka's Tripartite Model demonstrated that the pressures from family, peers, media, etc (2011) are the main contributors to body dissatisfaction. Adhering to the mesomorphic ideal is not to obtain a lower BMI, but to have muscular definition coupled with low body fat. Therefore, because a man with more muscle mass and less body fat can weigh more than a man with less

muscle and more body fat, the relationship between BMI and body dissatisfaction is not simple. The pressures that men navigate are a core element to the body-related dissatisfaction.

In the current study, men who reported higher body mass index (BMI) were more likely to report perceived pressures related to their body. The current findings are consistent with past research, suggesting that men who are overweight and obese often encounter weight bias and pressures to fit a particular ideal (e.g., Durso et al., 2012; Hilbert et al., 2014). Men who have higher BMIs are more likely to physically appear as overfat or with large stature and therefore encounter negative appraisals within the workforce (Rothblum et al., 1988) or judgement from their family who make comments about their size (Pearl et al., 2018). Furthermore, men with high BMIs may also seek health care services more often and thus be frequently in environments that put them at a higher risk to encounter weight bias. Moreover, given the perspective that an individual is to blame for their own obesity (Teachman et al., 2003, p. 75), health-care settings are often the location of weight oppression (e.g., Bocuier et al., 2005).

High BMI places a man at high risk to experience bias and pressure to achieve an ideal body type which then appears to be a mechanism to body dissatisfaction, as perceived body pressure mediated the relationship between BMI and body dissatisfaction. Self-objectification theory supports the current findings, asserting that individuals who live in objectifying cultures may adopt societal or the norm's perspective and begin to base judgements about their bodies on the extent to which they embody the cultural ideals (e.g., McKinley & Hyde, 1996). Previous findings suggest that negative messages embedded in body pressures may become incorporated into a person's sense of self and self-perception, such as body dissatisfaction (Major et al., 2014; Nussbaum, 1995). Men who have encountered bias or discrimination pressure about their weight may be more likely to begin believing that they should change their physical appearance to

match that of the ideal (e.g., Durso et al., 2012; Hilbert et al., 2014). Specifically, encountering lots of biased messages may convey to men that others will approve of them if they fit the ideal body size (Puhl & Brownell, 2003). Attempts to fit the societal norm or media-presented ideals may include actions related to body dissatisfaction, such as maladaptive eating patterns, social comparison, body surveillance, depressive symptoms, and decreased physical self-concept (e.g., Durso et al., 2012; Fitzsimmons-Craft et al., 2016; Hilbert et al., 2014; Puhl & Heuer, 2009).

Body dissatisfaction also mediated the relationship between perceived body pressures and depressive symptoms. For men, society reinforces particular body images related to one's physical appearance, ability, and stamina and, therefore, men who do not meet this ideal may experience body dissatisfaction and depressive symptoms (Magee & Galinsky, 2008). Our findings suggest that body dissatisfaction is one mechanism by which sociocultural pressures lead to symptoms of depression in young adult men. Furthermore, society often defines men's worth as their ability to be achieve success, strength, and power, therefore, reinforcing an expectation to meet a certain ideal. For men who do not meet these body-related ideals, they may feel experience of worthlessness or self-doubt, both experiences common in men who report depressive symptoms (e.g., Pearl & Lebowitz, 2014; Puhl & Brownell, 2001.

Men who felt dissatisfied with their body were more likely to report elevated depressive symptoms than men who felt positively about their physical stature and appearance. The current study supports previous explorations of the relationship of body dissatisfaction and depressive symptoms in college men (Olivardia et al., 2004; McFarland & Kaminski, 2008). Men who are body dissatisfied may feel pressure to conform to muscular body ideals, placing high expectations of their abilities, strength, and time spent at the gym. Furthermore, body dissatisfied

men may be at risk for low self-esteem and negative self-perception, both of which are related to depressive symptoms (e.g., Butzer & Kuiper, 2006).

Moderation by Protective Factors

Self Esteem

Men who felt positively about themselves overall (i.e., high self-esteem), reported lower levels of body dissatisfaction than men who felt more negatively about themselves. Moreover, the magnitude of perceived body-ideal pressures did not impact self-esteem's relationship with body dissatisfaction. Men who feel assured about their sense of self may not be as dissatisfied with their bodies, whether or not they have experienced pressures to fit an ideal body type (e.g., Butzer & Kuiper, 2006). Furthermore, separate from perceived body pressure, men with positive self-esteem may have more effective coping strategies and, therefore, may not feel as though they need to change their body size, stature, or muscular build. Self-esteem was related to body dissatisfaction separate from perceived messages about male body ideals.

Academic Self-Concept

The moderation analysis for academic self-concept was significant. For men who have negative perceptions of their bodies and appearance, positive views of one's academic self-concept may help buffer depressive symptoms (McGregor et al., 2020). Results suggested that men, despite having a negative perception of their bodies, who have positive views of their own academic ability, and believe that academic competence is a core component of their identity, are less likely to experience depressive symptoms than men who do not have academics as a source of identity or confidence. Men who feel positive about their academics may have a different source of confidence that buffers them from experiences of depression. However, the relationship between body dissatisfaction, academic self-concept, and depressive symptoms may

also occur in the opposite direction, as men who experience fewer depressive symptoms may have more motivation, energy, and internal locus of control, therefore, resulting in more engagement in academic environments.

Social Connectedness

Similarly, for men who have negative perceptions of their bodies and appearance, positive views of one's social connection may help decrease the reported depressive symptoms. Men with positive perception of their social connectedness may be more likely to interact and engage in social situations with peers and feel more connected with a support system. Having a support system and developing interpersonal relationships within a social system then is related to lower depressive symptoms, despite having negative views of one's own body. Within the college setting, belonging and feeling connected appears to be an important aspect of university culture. Men that feel competent in this area, despite body dissatisfaction, may feel more accepted and positive about their college experience.

Body dissatisfaction was related to pressure towards masculine ideals, as noted by the mediation findings, and, thus, may fuel men to compare themselves to unrealistic expectations and increase the likelihood of depressive symptoms. However, men that are accepted by others in social settings and perceive themselves as socially competent may then experience fewer depressive symptoms than men who feel unaccepted and driven to meet a physical ideal. Overall, despite negative images toward overweight people in media, men who feel positively about their social relationships, even if they have negative perception of their bodies, experience fewer depressive symptoms. To address the cross-sectional nature of analyses, interpretations must consider that men who experience high amounts of depressive symptoms may also feel more

withdrawn and engage in more isolating interpersonal behaviors, thus influencing a more negative evaluation of social connectedness and possibly decreasing physical activity levels.

Implications

For all college men, despite their perception of body related pressures, bolstering self-esteem may help to buffer against body dissatisfaction, according to the current study. Specific programming that addresses self-advocacy skills and confidence development may help to boost self-esteem and positive self-perception. Furthermore, it may be helpful for universities to create growth-focused environments and support authentic expression of one's self, such as having student-advocacy training for instructors and facilitating the development of centers that support various identities (i.e., multicultural, international, LGBTQ centers, etc.).

For college men with high BMI, universities may engage in counter-programming to affirm body acceptance and the dismantling of masculine norms. Furthermore, interventions to develop self-esteem in men with high BMI will help to buffer the development of body dissatisfaction. Psychologists may focus on other areas of identity, such as academic or social, to aid in self-esteem growth.

For men with negative perceptions about their physical bodies, strength, and appearance who experience depressive symptoms, university programs and psychologists who work with college men can work to address and develop a positive perception of their academic ability and social connectedness. Helping to develop a strong sense of identity and competence in academic areas can be beneficial against the experience of depressive symptoms. Specific interventions may include tutoring, supplemental instruction, and resuscitation classes, as well as university programming that encourage academic self-concept development in men, thus, creating a space where men can build community around academic development. In addition, universities have

access to GPA and test score records, therefore, offering an objective way to examine male students at risk for depression when GPAs change negatively over time.

In men who are dissatisfied with their bodies, developing positive perceptions of men's social competency may help to buffer against symptoms of depression, according to the current study. Specific outreach programs that address social skill education, social-event information, weight-loss programs, activity fairs, and college-wide events that encourage increase male student networks. Interventions may include interpersonal processing groups and social skill development and practice, especially with male students who are experiencing body dissatisfaction. College environments that encourage club, organization, and interactive school engagement may help to address the social competency in male students.

To address higher depressive symptoms in men who identified as LGTBTQ compared to men who identified as straight, treatment may target social comparison behavior, body surveillance behaviors, and dismantling self-objectification. In a study of over 100 men, men who identified as gay scored higher on self-objectification, body shame, body dissatisfaction and restrained eating (Martins et al., 2007). Furthermore, college campus resources, such as Pride/LGBTQ+ centers, college counseling centers, or other student groups, may engage in counter-programming to affirm body acceptance and the dismantling of masculine norms. Activities and advocacy opportunities may help men feel connected and empowered to change the message conveyed to their communities.

Limitations

Several limitations within the current study require discussion and may prompt additional research. First, all participants were collected from only one university setting, therefore, limiting the generalizability of resulting themes. Information from a variety of college settings (i.e.,

metropolitan, rural, area in the U.S, private liberal arts, elite universities, etc.) would contribute to the generalizability. Moreover, additional male college students would help to address concerns related to sample size, such as the chi square test for model fit and data normality. In addition, Common Method Variance can inflate or deflate multivariate multiple regression models, stating that interaction terms may be more difficult to detect (Siemsen, Roth, & Oliveira, 2010). Furthermore, participant responses were gathered in a cross-sectional manner, therefore, limiting the interpretation of possible risk factors to the development of depressive symptoms, as the directionality of all correlations is unknown.

Future Directions

In the development of interventions, future research may also focus on the longitudinal protective factors in the development of depression in college men. Utilizing the results from the current study, exploration of interventions addressing facets of self may be beneficial to further understand how the development of a positive and growth-oriented sense of self throughout adolescence may decrease the likelihood of depressive symptoms. Furthermore, research may also further explore the efficacy of counter programming to the mesomorphic male body ideal on college campuses. Specifically, attempts to fit the societal norm or media-presented ideals such as maladaptive eating patterns, social comparison, body surveillance, depressive symptoms, and decreased physical self-concept may also be further explored.

The transition into adulthood and college can be a source of stress; evidence suggests that many college students show a rise in distress, depressive symptoms, obsessiveness, and difficulty coping with adversity (Fisher & Hood, 1987). Investigating, the influence of college transition on self-perception, body weight, and well-being may also help to create specific interventions for college men that address other stressful factors. Finally, explorations regarding specific

differences between men and women in the influence of different aspects of self-perception on depressive symptoms may allow for more specified treatment or preemptive intervention.

Due to the higher reporting of depressive symptoms in men who identified as gay, bisexual, asexual, trans or queer, future research may explore how specific body messaging may impact the LGBTQ population. Both genderization, as well as, heteronormative sexualization present body-related pressures increase the risk of body dissatisfaction, depressive symptoms, and overall lower well-being (e.g., Joy & Numer, 2018; Kaminski, Chapman, Haynes, & Own, 2005). Furthermore, the oppression and bias, separate from body-related pressures, that LGBTQ men face may also contribute to increased depressive symptoms (Kimmel & Mahalik, 2005; Velez et al, 2016).

Overall, the current study theorized that college men's BMI was, itself, related to depressive symptoms and that the relationship was mediated by perceived body pressures and body dissatisfaction. Furthermore, different aspect of one's self, including self-esteem, academic self-concept, and social connectedness were proposed as moderators. Results demonstrated a mediating effect for perceived body pressures and body dissatisfaction. Academic self-concept and social connectedness had significant buffering effects, though self-esteem contributed to overall improved well-being. Therefore, intervention and therapy could address men's view of their own academic self-concept and social competency, especially in men who feel negatively about their body. In addition, fostering self-esteem in all college men may help to decrease the risk of body dissatisfaction and depressive symptoms.

The research literature regarding psychological associations with obesity and overweight status rely heavily on correlational data, however, so it is possible, the relationship between BMI and depressive symptoms is bidirectional. A meta-analysis of 15 longitudinal studies conducted

by Luppino et al. (2010) provides evidence for a bidirectional relationship. The authors discussed the bidirectional nature of their results and stated that 55% of obese persons had an increased risk of developing depression over time, whereas 58% of depressed persons had an increases risk of obesity (Luppino et al., 2010). Furthermore, time appeared to be a factor in strengthening each relationship, with each variable becoming a stronger predictor of the other variable over time (Luppino et al., 2010).

When examining how depression may place individuals at risk for being overweight or obese, Bjorntorp (2001) discussed that depression induces obesity through neuroendocrine disturbances and long-term activation of the hypothalamic-pituitary-adrenal axis (HPA axis). Moreover, the use of antidepressants may increase risk for weight gain (Stunkard et al., 2003). Psychological factors of depression, such as low motivation for exercise and/or low motivation for consumption of a holistic diet (i.e., emphasis on balancing all food groups) may also contribute to weight gain (Luppino et al., 2010).

In contrast, related to the relationship between BMI and symptoms of depression, the Luppino et al (2010) meta-analysis displayed that baseline overweight was associated with depression in young adults, but was not associated with depression in adolescents or children. In addition, articles in the meta-analysis discussed the relationship between inflammatory pathways, biological consequence of diets that put people at risk for obesity (e.g., high in sugars, refined carbohydrates, and fried food), and the experience of depressive symptoms (e.g., Atlantis & Ball, 2008; Bremmer et al., 2008; Milaneschi, 2009; Vaccarino et al., 2007). Changes in neurotransmitters, peptides, gut bacteria, etc. may also influence the relationship to depressive symptoms in obese or overweight individuals (Atlantis & Ball, 2008; Belanoff et al., 2001; Bremmer et al., 2008; Derenne & Beresin, 2006; Holsboer, 2000; Milaneschi, 2009; Vaccarino et

al., 2007). Furthermore, another biological process that may partially mediate the relationship between body mass and depression is the HPA axis, as obesity involves the dysregulation of HPA axis (Belanoff et al., 2001; Holsboer, 2000), which can result in abnormal levels of endocrine hormones, such as cortisol (Holsboer, 2000).

APPENDIX A

BIDIRECTIONALITY OF BMI AND DEPRESSIVE SYMPTOMS

The research literature regarding psychological associations with obesity and overweight status rely heavily on correlational data, however, so it is possible, the relationship between BMI and depressive symptoms is bidirectional. A meta-analysis of 15 longitudinal studies conducted by Luppino et al. (2010) provides evidence for a bidirectional relationship. The authors discussed the bidirectional nature of their results and stated that 55% of obese persons had an increased risk of developing depression over time, whereas 58% of depressed persons had an increases risk of obesity (Luppino et al., 2010). Furthermore, time appeared to be a factor in strengthening each relationship, with each variable becoming a stronger predictor of the other variable over time (Luppino et al., 2010).

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APPENDIX B

FORMS OF WEIGHT BIAS

Implicit bias occurs outside a person's awareness and may be exhibited through minor decisions made throughout the day, such as how far an individual sits from an obese person compared to a person of normal weight (Bessenoff & Sherman, 2000; Dovidio et al., 2002; Teachman et al., 2003). In a series of experimental studies, participants were, as a part of the study design, informed that "obesity is caused predominantly by overeating and lack of exercise" (Teachman et al., 2003, p. 75). After reading the provided information, participants indicated higher levels of implicit biases toward overweight persons, compared to controls. In follow up experimental studies, participants read stories about discrimination toward obese people, with the goal of evoking empathy (Teachman et al., 2003). However, the participants who read the provided stories did not indicate lower levels of bias, compared to controls, though overweight participants did report diminished implicit bias. Findings conveyed implicit biases as strongly consistent and ingrained (Teachman et al., 2003).

On the other hand, explicit biases are conveyed through self-report or direct behaviors, such as negatively assessing overweight job applicants compared to normal weight applicants (Puhl & Brownell, 2006). Being yelled at on the street, physically assaulted, or socially isolated based on one's size are additional examples of explicit bias that are experienced by overweight individuals (Wadden & Stunkard, 1993). Weight biases are the culmination and behavioral action of stereotypes that are often based on other's perception of visual features (Fiske & Taylor, 1984). Based on such visual features, overweight individuals are easily categorized and discriminated.

APPENDIX C

THEORETICAL MODELS

Biopsychosocial Model

Biopsychosocial model of depression suggests that biological, psychological, and social factors are all interlinked and interdependent on one another (Akiskal & McKinney, 1975). There are ongoing dynamic and reciprocal relationships between each factor (see Figure 6; Gilbert, 2004, p.103). Biologically, factors of depression are proposed as people's innate temperament, genetic makeup, stress hormones, and innate neurological structures. In addition, genetic research has provided evidence of hereditary genetics being a major factor in the origin of depression (Zuckerman, 1999). Moreover, when experiencing psychological stressors, people who are depressed exhibited higher cortisol than non-depressed individuals (Burke, Davis, Otte, & Mohr, 2005). Furthermore, biological changes in neurotransmitters, protein peptides, and gut bacteria appear to influence the development of depression (Atlantis & Ball, 2008; Bremmer et al., 2008; Derenne & Beresin, 2006; Milaneschi, 2009; Vaccarino et al., 2007), and neuroscience research has observed reduced cortical size as being associated with depressive symptoms (Elkis, Friedman, Wise, & Meltzer, 1995; Zuckerman, 1999).

Psychological factors of the biopsychosocial model of depression include negative patterns of thinking (i.e. body dissatisfaction), coping strategies, internalization, depression, and impaired emotional intelligence. Early psychological states, such as childhood adversities or positive parenting styles appear to predispose or protect against the development of adult depression (Bernet & Stein, 1999). In addition, innate temperaments and personality traits, such as neuroticism and interpersonal sensitivity (Sakado, Sata, Uehara, & Sakado, 1999; Van Os, Park, & Jones, 2001), have been demonstrated as a predisposing factor to depressive symptoms. Furthermore, traumatic experiences and parenting styles have demonstrated a link to disrupted affect regulation and depressive symptoms (Kooiman et al., 2004). Bidirectional relationships

exist between biological factors and psychological factors; for example, individual temperament and personality may influence whether a person acts in ways typically characteristic of depression (Garcia-Toro & Aguirre, 2006).

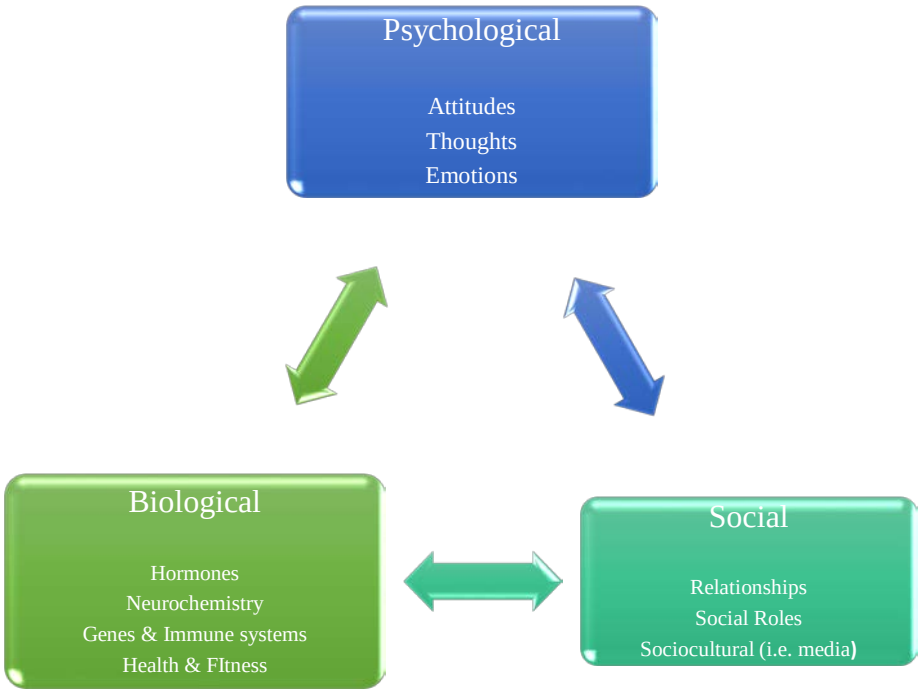

Figure C.1. Adapted biopsychosocial model from Gilbert (2004, p.103).

Social factors propose that depression can be a result of societal factors, such as traumatic situations (Post, 1992, Bernet & Stein, 1999), lack of social support, or oppressive experiences, including weight oppression (Carpenter, Hasin, Allison, & Faith, 2000; Greenleaf, Petrie, & Martin, 2014). Social factors bidirectionally relate to biological factors, as social events are capable of serving as triggers for turning genes on and off, causing changes in brain functioning (e.g., Sequeira & Turecki, 2006; Sibille et al., 2004). Social and psychological factors also interact with one another. Environmental and social causes of depression are often subtle; for example, societal ideals regarding appearance implicitly impact how people feel about themselves and their own bodies (Hesse-Biber,Leavy, Quinn, & Zoino, 2006), such that learned

beliefs about relationships can affects one's social behavior (Gilbert, 2004, p.104). Manifested social behavior can create interpersonal distress which affects physiology, such as stress hormone production, as well as relational schemas and future social behavior (Gilbert, 2004, p.104). Using this biopsychosocial lens, the current study examines a modified tripartite model.

Tripartite Model

The tripartite model, an ecological framework, proposes that social comparison and internalization of appearance ideals mediate the relationship between sociocultural influences (peers, parents, media) and body dissatisfaction and eating disturbance in female populations (e.g., Keery, van den Berg, & Thompson 2004; Thompson, Heinberg, Altabe, & Tantleff, 1999; van den berg, Thompson, Brandon, & Coovert, 2002). Additional work has typically indicated that there are direct sociocultural influences on body dissatisfaction, in addition to the indirect effects, such as mediation by appearance-ideal internalization and implicit-appearance comparison. These models focus on body dissatisfaction leading to eating disturbances (e.g., Keery et al. 2004; Shroff & Thompson 2006; van den Berg et al. 2004; Yamamiya, Shroff, & Thompson, 2008).

Tylka (2011) adapted the tripartitie model for men and included a dual body image pathway of muscularity and body fat dissatisfaction. Furthermore, Tylka also added dating partners as a source of social influence to the existing model's sources, peers, parents, and the media. In a sample of 473 undergraduate males, muscularity dissatisfaction and body fat dissatisfaction were significant and distinct body dissatisfaction pathways to disordered eating behaviors and behaviors of muscularity enhancement, respectively. Furthermore, pressure from friends, family, media, and dating partners to meet the mesomorphic (i.e., strong, lean, muscular,

and athletic) ideal, were all significant contributors to the model. Furthermore, internalization of weight stigma was a key mediator in the model (Tylka, 2011).

Though the current study is, in part, based on the framework of the tripartite influence model, men who are solely high in drive for muscularity will be removed from the study, as these men are dissatisfied because of their desire to gain weight or muscle rather than dissatisfaction based on body fat. Furthermore, the tripartite model focuses on body dissatisfaction and the resulting disordered eating, as discussed previously, body dissatisfaction contributes to other negative psychological outcomes, such as depressive symptoms. Specifically, body dissatisfaction has been identified as a partial mediator of the relationship between BMI and depression (e.g., Friedman, Reichmann, Costanzo, & Mustane, 2002; Gavin, Simon, & Ludman, 2010), thus indicating the influence that people's own perceptions of their body has on depressive symptoms.

The Proposed Model

The proposed model was modified from on the tripartite influence model and current literature regarding the relationships between BMI, body dissatisfaction, and depression. The modified model, therefore, will include the following constructs: BMI, experiences of weight oppression, internalization of weight stigma and body-ideals, body dissatisfaction, and depression. The function of weight oppression, internalization, and body dissatisfaction are proposed as a three-stage process (i.e., serial mediation) that mediates relationship between BMI and depression.

Furthermore, based on research on body mass, body dissatisfaction, and depressive symptomology, the current model examined whether BMI itself puts men at a risk for depressive symptoms. In addition, the current model proposed that body dissatisfaction partially mediated

the relationship from BMI to depressive symptoms, thus allowing for examination of how much variance in body dissatisfaction was accounted for by oppression and internalization, compared to variance accounted for by BMI. In order to examine possible protective factors, various moderators were examined as influencing the proposed pathways. Therefore, we hypothesized several specific pathways, as well as various moderators to our proposed model.

Self-esteem, as discussed, has been demonstrated as associated with experiences of weight stigma, as more stigmatizing events experienced relates to lower esteem (e.g., Hilbert et al., 2014; Wu & Berry, 2018). Furthermore, individuals who report a well-defined sense of who they are and feel positive about themselves have been less likely to endorse internalization (e.g., Butzer & Kuiper, 2006; Vartanian & Dey, 2012). Therefore, in the current study, self-esteem was explored as a possible moderator of the relationship between weight oppression and internalization of that oppression.

The relationship between body dissatisfaction and depression was also explored, with the current study exploring both academic self-concept and social connectedness as moderators. Given the link between academic self-concept and elevated self-esteem and decreased anxiety and depressive symptoms (e.g., Dishman et al., 2006; Fathi-Ashtiani, Ejei, Khodapanahi, & Tarkhorani, 2007), the current study examined academic self-concept as a moderator between body dissatisfaction and depression. Similarly, social connectedness has consistently been linked with mental health outcomes, such as anxiety, depressive symptoms, decreased well-being, and lower self-esteem (e.g., Argyle, 1987; McAdams & Bryant, 1987; Weiss, 1973). Furthermore, feeling more socially competent has demonstrated a link to decreased body dissatisfaction (Gillen & Lefkowitz, 2006), as well as decreased depressive symptoms even within body dissatisfied individuals (McGregor et al., 2018). Feeling more socially connected may decrease

the likelihood that a person who is dissatisfied with their body experiences elevated depressive symptoms, therefore, the current study proposed social connectedness as an alternative moderator to the relationship between body dissatisfaction and depressive symptoms.

APPENDIX D

UNIVERSITY OF NORTH TEXAS INSTITUTIONAL REVIEW BOARD

INFORMED CONSENT NOTICE

University of North Texas Institutional Review Board
Informed Consent Notice

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study: Model of Body, Health, and Identity in College Men

Investigators: Patricia Kaminski, Ph.D., University of North Texas (UNT) Department of Psychology. Carlie McGregor, M.S. University of North Texas (UNT) Department of Psychology.

You are being asked to participate in a research study and taking part in this research study is voluntary. The researchers will explain the study and will answer any questions that you may have. It is your choice whether you would like to participate in this study or not, therefore if you choose to participate in this study and then choose to withdrawal, that is your right, and your decision will not be held against you.

Purpose of the Study: The purpose of this study is to assess the impact of experiences related to one's physicality, body, and self-concept on well-being and mental health in college men.

Study Procedures: You will be asked to complete a 60-75 minute single session occurring in Terrill Hall Room 281, where you will be asked to complete a survey hosted on the Qualtrics website regarding their experiences with their body, health, and identity. Once you have completed the 60-minute Qualtrics survey, there will be a brief lab component. After the completion of the 5-minute lab data collection, the involvement in the initial data collection is complete. After completion, you will receive course credit in their respective courses, as well as one drawing entry to win 1 of 6 $50 gift cards.

After one month, you will be contacted, via email, and will receive a link to another Qualtrics survey. This 20-minute survey will reassess your mood and well-being, as well as your self-reported BMI. This process will occur again after another month, at which time the participation in this study is complete. For completion of the surveys at each time point, you will receive additional course credit and another drawing entry to win 1 of 6 $50 gift cards.

Foreseeable Risks: No foreseeable risks are involved in this study, however, if you experience unreasonable discomfort when completing the research activity, you may choose to stop participating at any time without penalty. The researchers will work to prevent any problem that may occur, but the study may involve risks to the participant that are unforeseeable. UNT does not provide medical services or financial assistance for emotional distress or injuries that may occur while participating in this research. If you need to discuss your discomfort further, please contact a mental health provider, or you may contact the researcher who will refer you to appropriate services. If your need urgent, helpful resources include National Alliance for The Mentally Ill at 1-800-950-NAMI, UNT's Counseling and Testing Services at 940-565-2741, UNT Psychology Clinic at 940-565-2631 and Denton County MHMR Center at 1-800-762-0157.

Benefits to the Subjects or Others: Your participation in this study is not expected to result in any direct benefits to you, though you will have the opportunity to contribute to enhancing the understanding of weight oppression, internalization of weight-related beliefs, body satisfaction, and depression . Information gained from this study, however, will help inform mental health practitioners, university campuses, and individuals about risk factors and protective buffers associated with well-being for college males who experience weight bias.

Compensation for Participants: Completion of the initial stage of the study will result in 6 SONA credits awarded to your UNT Psychology SONA account for their use for participating courses. For non-psychology courses, extra credit will be granted at the discretion of the course instructor. Completion of the two 1-month follow ups will also result in an addition 1 SONA credit, each. For each of the 3 time-points completed, you will receive additional course credit and another drawing entry to win 1 of 6 $50 gift cards. If you chose to not complete the initial study procedures, no SONA credits will be awarded. There are research alternatives offered through UNT Psychology SONA to be completed if you do not want to engage in research studies.

Procedures for Maintaining Confidentiality of Research Records: The only personally identifying information requested from you in relation to participating in this study is providing an email to send the 1-month follow up surveys. Each email will be attached to an anonymous user code and this information will be kept in a password protected file that only the research PI and student researcher has access to. Confidentiality will be maintained to the degree possible given the technology and practices used by the online survey company. Your participation in this online survey involves risks to confidentiality similar to a person's everyday use of the internet. Data collected in this study will be reported in any publications or presentations only in aggregate form.

Data Utilization
The data collected in this study will be utilized for a published dissertation, journal, and poster projects. After the study is completed, you have the option to contact the researcher to withdraw permission for continued use.

Questions about the Study: If you have any questions about the study, you may contact Dr. Patricia Kaminski at Patricia.Kaminski@unt.edu or Carlie McGregor at CarlieMcgregor@my.unt.edu.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-4643 with any questions regarding the rights of research subjects.

Research Participants' Rights:
Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:

- Dr. Patricia Kaminski (or one of the other research investigators) has explained the study to you and you have had an opportunity to contact him/her with any questions about the study.
- You have been informed of the possible benefits and the potential risks of the study.

- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You understand you may print a copy of this form for your records.

_____ I want to participate and continue with the survey
_____ I am not interested in participating and want to exit the survey.

APPENDIX E

DEMOGRAPHICS QUESTIONNAIRE

Q1 What is your gender?

Male (1), Female (2), Trans Male (3), Trans Female (4), Gender Fluid (5), Other (please explain)

Q2 How old are you (in years)? _____

Q3 How would you best describe your sexual orientation?

- O Asexual (not having sexual feelings/attraction towards others) (1)
- O Bisexual (2)
- O Gay/Lesbian (3)
- O Heterosexual (Straight) (4)
- O Questioning (5)
- O Sexually Fluid (6)
- O Other (please explain) (7) _____

Q4 What is your ethnic-racial background?

- O Asian/Asian American (1)
- O Black/African American (2)
- O Caucasian/White (3)
- O Hispanic/Latino/a/x (4)
- O Middle Eastern/Arab (5)

O Biracial (please specify) (6) _____

O Other (please specify) (7) _____

Q5 What is your relationship status?

O Single, not dating (1)

O Single, dating casually, (2)

O Single, but dating seriously (3)

O Living together/engaged (4)

O Married/partnered (if you consider yourself married before your current relationship, how many times were you married before)? (5) _____

O Divorced/Seperated (6)

O Other (please specify) (7) _____

Q18 How long have you been in your current relationship?

- O I am not in a relationship (1)
- O 3 months or less (2)
- O 3-9 months (3)
- O About 1 year (4)
- O About 2 years (5)
- O 3-4 years (6)
- O 5 years or more (7)

Q6 What is your class rank?

Freshman (1), Sophomore (2), Junior (3), Senior (4), Other (please specify) (5)

Q7 Do you consider yourself an athlete?

Yes (1) , No (2)

Q8 Do you currently engage in a sport (when 'in season') and/or regular physical activity?

- O Yes (1)
- O No (2)

Q9 If yes, what sport or activities have you been involved in, in the past year (at a college athletics level)?

Football (1) , Basketball (2) , Golf (3), Track (4), Hockey (5), Lacrosse (6), Cross Country (7), Swimming (8), Diving (9), Martial arts (10)

Q10 If yes, what sport or activities have you been involved in, in the past year (at an intramural athletics level)?

Flag Football (1), Golf (2), Water Polo (3), Tennis (4), Volleyball (5), Soccer (6), Baseball (7) Weightlifting (8), Softball (9)

Q11 In an average week, about how many hours do you spend working out?

_____

Q12 What is your current weight?

_____,

Q13 How tall are you? (feet' inches")

4’10 through 7’0 (1 through 36)

Q14 What is the most you have ever weighed?

_____

Q15 What is the least you have weighed since turning 18yrs of age?

_____

Q16 What do you think is your ideal weight?

_____

Q19 Have you ever been diagnosed with any of the following:

Attention-Deficit Disorder (ADD, ADHD or ‘hyperactivity) (1), Eating Disorder (type?) (2), Alcohol Abuse or Dependence (3), Drug Abuse or Dependence (4), Anxiety Disorder (5), Major Depressive Disorder (6), Biopolar Disorder (7), Other (please specify) (8)

Q20 If you answered "yes" to any of disorder in Question #19, have you ever been in counseling, therapy, or other type of treatment?

Yes (1) , No (2)

Q21 Have you ever served in the United States Military? Yes (1), No (2)

Q22 If yes, which military branch do/did you serve?

- O Marines (1)
- O Army (2)
- O Air Force (3)
- O Navy (4)
- O Coast Guard (5)

Q17 Are you currently employed?

- O Yes, part time (1)
- O Yes, full time (2)
- O No (3)

Q104 Do you have a desire to change your body size?

- O Yes (1)
- O No (2)

Q106 How strong is the desire to change your body in the described manner?

	No desire / Very Strong Desire 0 10 20 30 40 50 60 70 80 90 100
I want to gain weight to gain muscle ()	

I want to gain weight to gain fat ()	
I want to lose weight to gain muscle ()	
I want to lose weight to lose fat ()	

APPENDIX F

DEBRIEF LETTER

Dear Research Participant,

Thank you for participating in our study. Our goal was to collect data to understand the psychological and social experiences of weight bias and how weight related biases may contribute to possible psychological outcomes such as depression and body dissatisfaction in adult males. The majority of research about weight bias and body image disturbances are focused on females only, and the research from this study will facilitate a better understanding of possible protective factors among men.

We hope that taking this questionnaire was not stressful for you. Nevertheless, taking a questionnaire can cause stress and tension about life problems. If you have any questions about eating and/or body image disturbance, please let the researcher know right now. We can help you get an appointment with a mental health professional. If you have any questions after you leave today or would like help at a later date, call Dr. Trish Kaminski at (940-565-2671).

The following is a list of names and phone numbers of help lines and agencies that offer counseling and other services to help men with problems they might have dealing with eating and/or body image disturbances.

- Counseling and Testing Services (UNT, Denton) – offers personal counseling services on campus to all students at no charge [940-565-2741].
- National Alliance for The Mentally Ill – offers one on one conversation with someone who can help answer your questions, and is toll free [1-800-950-NAMI].
- National Eating Disorders Association (www.nationaleatingdisorders.org) – provides resources, education, and support to individuals affected by eating and body image disturbances [1-800-9312237]
- Psychology Clinic (UNT, Denton) – individual assessment and therapy with fees set according to income level [940-565-2631].

The results of our study will be available to you in the future. If you would like a copy of our results, please give us your address now or contact us at a later date. You may keep this sheet for your records.

Sincerely,

Trish Kaminski, PhD

Carlie McGregor, M.S. Associate Professor of Psychology Graduate student

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